MANAGEMENT PRESENTATION
ON
DISTRIBUTED DATA PROCESSING

MANAGEMENT PRESENTATION
ON
DISTRIBUTED DATA PROCESSING

MANAGEMENT PRESENTATION

ON

DISTRIBUTED DATA PROCESSING

TO

IBM CORPORATION

GENERAL SYSTEMS DIVISION

ATLANTA, GEORGIA

BY

INPUT

JUNE 6, 1978

PRESENTATION OUTLINE

MORNING SESSION: MANAGEMENT OVERVIEW

- INTRODUCTION (S. MANTELL)

- EXECUTIVE SUMMARY (S. KAUFMAN)

  - SUMMARY OF FINDINGS

  - RESULTS OF STATISTICAL ANALYSIS

  - RECOMMENDATIONS

- FORECASTS OF U.S. ALL VENDOR POTENTIAL AND SHIPMENTS (S. MANTELL)

  - METHODOLOGY

  - CONCLUSIONS

PRESENTATION OUTLINE

AFTERNOON SESSION: ANALYSIS BY INDUSTRY GROUP

- DISTRIBUTION (S. KAUFMAN)
- PROCESS AND DISCRETE MANUFACTURING (S. MANTELL)
- BANKING AND EDUCATION (P. COLEN)
- MOTOR FREIGHT, HOSPITALS, LOCAL GOVERNMENT (S. KAUFMAN)

INTRODUCTION

- ORGANIZATION FOR THE STUDY
  - INTERVIEW PLAN
  - OTHER RESEARCH
- USER CONTACTS AND INTERVIEWS
  - QUALIFICATION OF RESPONDENT
  - HOST AND REMOTE INTERVIEWS
  - ON-SITE AND TELEPHONE INTERVIEWS
- PROFILE OF RESPONDENT
- SEGMENTATION BY INDUSTRY AND GROUP SIZE

DISTRIBUTED DATA PROCESSING (DDP)

- "DDP IS A DATA PROCESSING TECHNIQUE WHEREBY MULTIPLE INTERRELATED SYSTEMS ARE DEPLOYED ALONG ORGANIZATION, FUNCTIONAL OR GEOGRAPHIC LINES"

DDP INDUSTRY SEGMENT CATEGORIES AND CELL SIZES (UNITS)

DDP SEG.	POT'L SEGS	NAME	MUE			SUE		GSD-2		UNITS
			A	B	C	D	E	F	G	
1	1-5	WHOLE-SALE	20-99	100-249	250-999			1-9.9K	10K+	EMPLOYEES
2	14-22	RETAIL	20-99	100-249	250-999			1-9.9K	10K+	EMPLOYEES
3	34,36 38,40	PROC. w/o PETR.		100-499	500-999		500-999	1-9.9K	10K+	EMPLOYEES
4	37	PETROL			500-999			1-9.9K	10K+	EMPLOYEES
5	35	AERO/ MOT			500-999			1-9.9K	10K+	EMPLOYEES
6	35	MACH/ FAB			500-999	250-499	500-999	1-9.9K	10K+	EMPLOYEES
7	45,46	BANKS		50-499	500-999			1-9.9K	10K+	ASSETS($M)
8	63	SCHOOL DIST.		10-24.9						ENROLLMENT (K)
9	55	HOSPI-TALS	100-299	300-499	500+					BEDS
10	65-67	CITY/ COUNTY			100-249			250+		POPULATION (K)
11	41	MOT. FRT.			50-99.			100 +		REVENUE($M)
12	64	COL-LEGES			5-9.9			10-19.9		ENROLLMENT (K)

INPUT

DDP RESPONDENTS (PLUS 6 ON-SITE NON-DDP*)

DDP SEG.	INDUSTRY NAME	MUE						SUE		GSD-2				TOTAL ON-SITE INTER-VIEWS	TOTAL ENTERPRISES CONTACTED
		A		B		C		D		E		F			
		H	R	H	R	H	R	H	R	H	R	H	R		
1	WHOLESALE	1	1	1+1*		3+1*				1+1*		1		11	126
2	RETAIL			2*		2+1*				7		3	2	17	72
3	PROCESS			2		5		1	1	2	1	3	1	16	44
4	PETROLEUM									2	2	1		5	10
5	AERO/MOTOR					3				2		3	2	10	22
6	MACH/FAB					3	2			3		5	1	14	51
7	BANKS			1		4				5	1	2		13	28
8	SCHOOLS			3										3	7
9	HOSPITALS	1		2	1	3	2							9	37
10	CITY/CNTY					4				3	1			8	24
11	MOTOR/FRGT					2	1			2	1			6	24
12	COLLEGES					4	1			1	1			7	26
	TOTALS	2	1	9+3*	1	33+2*	6	1	1	28+1*	7	18	6	119	471

DISTRIBUTED DATA PROCESSING

EXECUTIVE SUMMARY

DDP OUTLOOK

- DDP ACCEPTANCE AND IMPLEMENTATION IS CURRENTLY NOMINAL

  - CONCEPT NOT WELL UNDERSTOOD WITHIN MOST GSD-1 ENTERPRISES

- BREAKPOINT APPEARS TO BE IN THE 1,000 TO 2,000 EMPLOYEE RANGE

- GSD-2 ENTERPRISES ARE ACTIVELY PLANNING OR IMPLEMENTING DDP SYSTEMS

  - A NUMBER OF PILOT INSTALLATIONS ARE PLANNED ON BECOMING OPERATIONAL OVER THE NEXT 12 MONTHS

- THE CONCEPT IS GAINING ACCEPTANCE AT SHARPLY DIFFERING RATES WITHIN THE 12 INDUSTRY SECTORS EXAMINED

RANK ORDERING OF

DDP SENSITIVITY BY INDUSTRY

(1977-1986)

INDUSTRY	1977	1986
WHOLESALE	12	12
RETAIL	7	5
PROCESS (w/o PETROLEUM)	5	3
PETROLEUM	4	2
AERO/AUTO	6	7
DISCRETE MANUFACTURING	3	4
BANKING	2	1
SCHOOL DISTRICTS	8	8
HOSPITALS	9	10
CITY/COUNTY	10	9
MOTOR FREIGHT	11	11
COLLEGES	1	6

SYSTEM DEFINITIONS

SYSTEM CLASS	SAMPLE EQUIVALENT SYSTEM	PRICE (CURRENT $)
I	S/32, S/34, SERIES/1	<$3,000/MONTH
II	S/3-12, 15; 370/115	$3,000 < $10,000/MONTH
III	370/125; S/3-15 (LARGE)	$10,000 < $20,000/MONTH
IV	370/138+	$20,000+/MONTH

DDP SHIPMENT FORECASTS (1977-1986)

- 1977 ESTIMATED DDP SHIPMENTS WERE $1.7 BILLION
  - LESS THAN 10 PERCENT OF ALL CLASS I-III SYSTEMS ENTERED A DDP ENVIRONMENT
- APPROXIMATELY 85 PERCENT OF ALL 1977 AND 1986 SYSTEM SHIPMENTS WILL BE CLASS I
  - APPROXIMATELY 8,000 TOTAL SYSTEMS IN 1977 AND 140,000 TO 150,000 TOTAL SYSTEMS IN 1986 WILL BE ENTERING A DDP ENVIRONMENT
- THE ESTIMATED DOLLAR VALUE OF DDP SHIPMENTS IN 1986 IS PLACED AT $19 BILLION
- OVER 75 PERCENT OF THE TOTAL DDP SYSTEM DOLLAR VALUE WILL BE ACCOUNTED FOR BY CLASS IV SYSTEMS

PERCEIVED DRIVING AND INHIBITING FORCES (PRO)

- MOVE DATA MANAGEMENT AND CONTROL TO DATA SOURCE AND PRINCIPAL USER ("80/20 RULE")
  - IMPROVE TIMELINESS OF REPORTING
  - INCREASE ACCURACY
  - IMPROVE USER SERVICE
- RELIEVE CAPACITY LIMITATIONS
  - "BREAK THE MAINFRAME UPGRADE CYCLE"
- IS DDP REALLY MORE COST EFFECTIVE?
- IBM'S TACIT SUPPORT

PERCEIVED DRIVING AND INHIBITING FORCES (CON)

- COMMUNICATIONS IGNORANCE AND COST CONCERNS ARE A MAJOR NEGATIVE

- LACK OF HARDWARE/SOFTWARE/NETWORK STANDARDS REMAIN A DETERRENT TO ACCEPTANCE

  - NO SYSTEM SOFTWARE WITH NO PROVEN DBMS

- IBM NOT IN THE DDP MARKET WITH A FULLY SUPPORTED LINE OF PRODUCTS

DDP JUSTIFICATION

- EVOLUTIONARY PROCESS DRIVEN BY:
  - OFFLOADING THE MAINFRAME
  - USER COMPLAINTS
  - BUSINESS GROWTH
  - MARKET STRATEGIES
  - MERGERS AND ACQUISITIONS
- 65 PERCENT TO 70 PERCENT CLAIM TO HAVE PERFORMED A COST/BENEFIT ANALYSIS TO ELIMINATE OR REDUCE:
  - BATCH PROCESSING
  - MANUAL METHODS
  - ON-LINE DATA ENTRY
  - CENTRALIZED PROCESSING
  - KEY PUNCH
- DETAILED ROI/PAYBACK ANALYSES AND OPERATING SUPPORT ARE LACKING

<u>VENDOR SELECTION CRITERIA</u>

- <u>HARDWARE/SOFTWARE RELIABILITY</u> COUPLED WITH <u>MAINTENANCE SUPPORT</u> ARE DOMINANT FACTORS

- SOFTWARE/HARDWARE COMPATIBILITY COUPLED WITH THE DIVERSITY OF SOFTWARE LANGUAGES OFFERED BY VENDORS RANKED HIGHLY

- NETWORKING WITH 3270 EMULATION AND SDLC SUPPORT ARE CRITICAL FOR GSD-2 CLASSES OF ENTERPRISES

  - GSD-1 ENTERPRISES WOULD LIKE A TURNKEY PACKAGE

- SURPRISINGLY VENDOR OFFERED APPLICATIONS SOFTWARE AND "ONE STOP SHOPPING" WERE <u>LEAST</u> IMPORTANT

USER ATTITUDES TOWARD VENDORS

- DEC AND IBM WERE REGARDED AS MOST INFLUENTIAL IN PROMOTING DDP
  - IBM ONLY BY VIRTUE OF RECENT SERIES/1 AND SYSTEM 34 INTRODUCTIONS
- FREQUENT FAVORABLE MENTION WAS ALSO MADE OF HEWLETT-PACKARD, DATAPOINT, AND DATA GENERAL
- OVER 40 PERCENT OF ALL RESPONDENTS SINGLED OUT IBM AS MOST INHIBITING TO DDP:
  - "MAINFRAME CYCLE"
  - 3790 WAS UNFAVORABLY REVIEWED

CENTRALIZED VERSUS DECENTRALIZED CONTROL

- OVER 80 PERCENT OF ALL HOST AND REMOTE RESPONDENTS CURRENTLY HAVE CENTRALLY CONTROLLED DDP SYSTEMS DEVELOPMENT AND EQUIPMENT PROCUREMENT

- THE PROPENSITY TO DECENTRALIZE MAY INCREASE IN THE FUTURE BUT USERS MUST FIRST:

  - REGAIN CONTROL OF DATA AT THE HOST

  - DEVELOP DBMS AND OPERATING EXPERIENCE

- GSD-1 BUSINESSES ARE FREQUENTLY FAMILY OWNED AND AUTOCRATIC

- GSD-2 ENTERPRISES ARE MORE PRONE TO DECENTRALIZATION BUT TECHNOLOGY MUST BE TRANSPARENT TO THE END USER

- END USER ATTITUDES REGARDING CURRENT DDP EXPERIENCE IS OVERWHELMINGLY POSITIVE

  - 60 PERCENT TO 70 PERCENT RATED DDP GOOD TO OUTSTANDING

  - LESS THAN 5 PERCENT RATED DDP "POOR"

DDP WITHIN LARGE AND SMALL COMPANIES

- SMALL SUES/MUES DEMONSTRATE LIMITED DDP UNDERSTANDING
  - "MISSIONARY" EFFORTS COULD BE HUGE IN THE SHORT TERM
  - MORE DDP OPERATING EXPERIENCE REQUIRED
- TWO-THIRDS OF MUE INTERVIEWS CONDUCTED IN GSD-2 ENTERPRISES
  - CURRENT DDP MARKET CONCENTRATION
  - 1,000 TO 2,000 EMPLOYEE RANGE IS BREAKPOINT
- TELEPHONE EFFORTS AT LEAST DOUBLED IN ORDER TO FIND QUALIFIED/COOPERATIVE RESPONDENTS IN GSD-1
  - ESTABLISHMENTS WITH LESS THAN 100 EMPLOYEES WERE PARTICULARLY DIFFICULT

DDP WITHIN LARGE AND SMALL COMPANIES

- WITHIN GSD-1 ENTERPRISES:
  - DATA PROCESSING FUNCTION OCCUPIES LOWER IMPORTANCE
  - PERSONNEL LESS EXPERIENCED
- MANY OF THE PROPOSED SMALLER DDP SYSTEMS ARE RUDIMENTARY:
  - LIMITED NUMBER ACTUALLY IMPLEMENTED
- REMOTE INTERVIEW DIFFICULTIES:
  - NOT OPERATIONAL
  - REMOTE PERSONNEL NOT DATA PROCESSING PROFESSIONALS
  - PHYSICALLY CO-LOCATED WITH HOST
- HOWEVER, USER INVOLVEMENT CRITICAL IN PLANNING AND IMPLEMENTATION

DDP POSITIVE AND NEGATIVE FACTORS

- MOST SIGNIFICANT POSITIVE DDP FACTOR WAS THE COST/PERFORMANCE BENEFITS EXPERIENCED OR ANTICIPATED

  - IDENTIFIED BY 50 PERCENT OF ALL DDP RESPONDENTS

- FOLLOWED IN DESCENDING ORDER BY:

  - TIMELINESS OF RESULTS/INCREASED THROUGHPUT (38 PERCENT)

  - DATA ACCESSIBILITY FOR END USER (29 PERCENT)

  - REDUCTION IN MAINFRAME USAGE (18 PERCENT)

- NEGATIVE DDP FACTORS INCLUDED:

  - LOSS OF CONTROL (31 PERCENT)

  - INCREASED OPERATING COMPLEXITIES (25 PERCENT)

  - END USER CONFUSION/INCREASED FIELD SUPPORT (23 PERCENT)

  - GREATER COMMUNICATIONS DEPENDENCE (20 PERCENT)

NON-DDP USER PROFILES

- OVER 135 TELEPHONE INTERVIEWS WITH NON-DDP ENTERPRISES. HEAVY GSD-1 EMPHASIS IN:
  - WHOLESALING
  - RETAILING
  - DISCRETE MANUFACTURING
- BOTH EDP AND DDP EXPERIENCE LEVELS ARE SIGNIFICANTLY BELOW QUALIFIED DDP RESPONDENT LEVELS
  - ONLY 39 PERCENT HAD MORE THAN 9 YEARS OF DATA PROCESSING EXPERIENCE VERSUS 75 PERCENT FOR DDP RESPONDENTS
  - ONLY 17 PERCENT HAD PRIOR DDP EXPERIENCE VERSUS 60 PERCENT FOR DDP RESPONDENTS
  - WHAT IS DDP?
- WHY NOT DDP?
  - ENTERPRISE TOO SMALL
  - PREFERRED CENTRALIZATION OR
  - BELIEVED DATA PROCESSING NEEDS WERE MET BY HOST ALONE

NON-DDP USER PROFILES

- SURPRISINGLY, FEW NON-DDP RESPONDENTS CITED "COST/PERFORMANCE" BENEFITS AS A DDP STRENGTH
  - SOME BELIEVED IT WAS TOO COSTLY
- FACTORS INFLUENCING FUTURE EVALUATION OF DDP
  - GROWTH IN ENTERPRISE SIZE
  - MANAGEMENT MUST INCREASE ITS CONFIDENCE IN AND COMMITMENT TOWARD DATA PROCESSING
- LIMITED VISIBILITY EXISTED AS TO:
  - WHEN SUCH A DDP VALUATION (OR RE-EVALUATION) WOULD BE MADE OR
  - WHICH APPLICATIONS WOULD BE CONSIDERED FOR DDP IMPLEMENTATION
- ONLY 13 PERCENT OF NON-DDP RESPONDENTS BELIEVED THAT VENDOR SUPPLIED APPLICATIONS SOFTWARE WOULD BE A SUFFICIENT INDUCEMENT TO ADOPT DDP

KEY ARCHITECTURAL AND APPLICATIONS ISSUES

- STAR DDP CONFIGURATIONS CURRENTLY PREDOMINATE
  - MORE ADVANCED HIERARCHICAL NETWORKS IN BANKING AND DISCRETE MANUFACTURING
- LIMITED EVIDENCE OF RING NETWORKS (WITH OR WITHOUT HOSTS)
  - HOWEVER, OPPORTUNITIES MAY EXIST IN SELECTED APPLICATIONS
- LACK OF USER EXPERTISE AND VENDOR OFFERINGS RELATED TO NETWORKS
- KEY DDP APPLICATIONS ARE ORDER ENTRY, INVOICING, AND INVENTORY CONTROL

DATA BASES

- 55 PERCENT OF DDP HOST RESPONDENTS WILL DISTRIBUTE DATA BASES BUT
  - PRIMARILY REDUNDANT FILE SUBSETS
  - LITTLE UNDERSTANDING OF THE PROCESS
  - NO CREDIBLE DBMS SOFTWARE PACKAGE
- DECISION TO DISTRIBUTE PIVOTS ON THE ORGANIZATION STRUCTURE AND COMMUNICATIONS COSTS
- WHY DISTRIBUTE DATA BASES?
  - SECURITY ISSUES
  - DATA ACCESSIBILITY/TIMELINESS/ACCURACY
  - LOWER COMMUNICATIONS COSTS
- NODAL DATA BASES VARY WIDELY (LESS THAN ONE MEGABYTE UP TO 100+ MEGABYTES)
- KEY DISTRIBUTION METHOD IS DOWNLOADING WITH FILES UPDATED MULTIPLE TIMES DAILY OR WEEKLY

DDP COMMUNICATIONS

- DDP COMMUNICATIONS ISSUES ARE GENERALLY NOT WELL UNDERSTOOD

- CHIEF CONCERNS ARE RELIABILITY, SPEED, AND COST

- SOPHISTICATED USERS ARE EXTREMELY SENSITIVE TO COMMUNICATIONS COST AND TRENDS AND WEIGHT THESE FACTORS HEAVILY REGARDING DDP

- BATCH MODE IS EXPECTED TO CONTINUE TO BE THE DOMINANT TRANSMISSION METHOD

- RELATIVELY LITTLE CONCERN OVER HOST/REMOTE UNCOUPLING ALTHOUGH 60 PERCENT EXPECTED THEIR OPERATIONS TO DEGRADE IF DISRUPTION WAS GREATER THAN ONE DAY

DDP SOFTWARE

- SOFTWARE COMPATIBILITY AND LANGUAGE DIVERSITY ARE EXTREMELY IMPORTANT DDP VENDOR SELECTION CRITERIA

- DATA BASE DISTRIBUTION SUFFERS FROM A LACK OF AVAILABILITY OF A PROVEN DBMS SOFTWARE PACKAGE

- AN INCREASE IN HARDWARE/SOFTWARE COMPATIBILITY IS WIDELY REGARDED AS HAVING AN IMPORTANT POSITIVE IMPACT ON DDP

- THE AVAILABILITY OF APPLICATIONS SOFTWARE DOES NOT APPEAR TO BE A KEY DDP MARKET FACTOR

- COBOL IS BY FAR THE MOST COMMONLY USED LANGUAGE
  - BASIC, RPG, AND FORTRAN ARE OTHER LANGUAGES MENTIONED

INPUT

REGULATION AND SECURITY

- BOTH SUBJECTS GENERALLY MET WITH A GREAT DEGREE OF DISINTEREST

- REGULATION ISSUES EVOKED INDUSTRY SPECIFIC COMMENTS. FOR EXAMPLE:

  - RETAIL DRUG/PATIENT PRESCRIPTION RECORDS

  - COMMERCIAL AVIATION/FAA MANDATED PARTS RECORDS

  - MOTOR FREIGHT/ICC RECORD DUPLICATION

- SECURITY ISSUES FOCUSED ON POSITIVE USER IDENTIFICATION AND AUDIT TRAILS

- ENCRYPTION CONCERNS WERE ONLY EXPRESSED BY LARGE MULTINATIONAL MANUFACTURING AND BANKING ENTERPRISES

OFFICE AUTOMATION AND SHARED INTELLIGENCE

- WHAT IS IT?

- ONLY THE LARGEST AND MOST SOPHISTICATED ENTERPRISES (PARTICULARLY IN THE PROCESS, DISCRETE MANUFACTURING, AND COLLEGE SECTORS) SEEM CAPABLE OF DEALING WITH THE ISSUE

- WITH THE EXCEPTION OF DISCRETE MANUFACTURING, LITTLE EVIDENCE EXISTED OF "TIEING-IN" WORD PROCESSING, PROCESS CONTROL, OR OTHER APPLICATIONS WITH HOST OR REMOTE INTELLIGENCE

RECOMMENDATIONS

- THE DDP "SELL" SHOULD BE DIRECTED AT GSD-2 ENTERPRISES

- SHORT TERM MARKET EMPHASIS SHOULD BE FOCUSED WITHIN BANKING AND THE DISCRETE AND PROCESS INDUSTRIES

- CONTINUE TO PENETRATE GSD-1 ACCOUNTS WITH INTELLIGENCE BASED STAND ALONE PRODUCTS UNDER THE ASSUMPTION THAT A HARDWARE SALE IS BEING MADE INTO A FUTURE DDP NODE

- TARGET THE CORPORATE DATA PROCESSING MANAGER AS THE FOCAL POINT FOR SELLING THE DDP CONCEPT

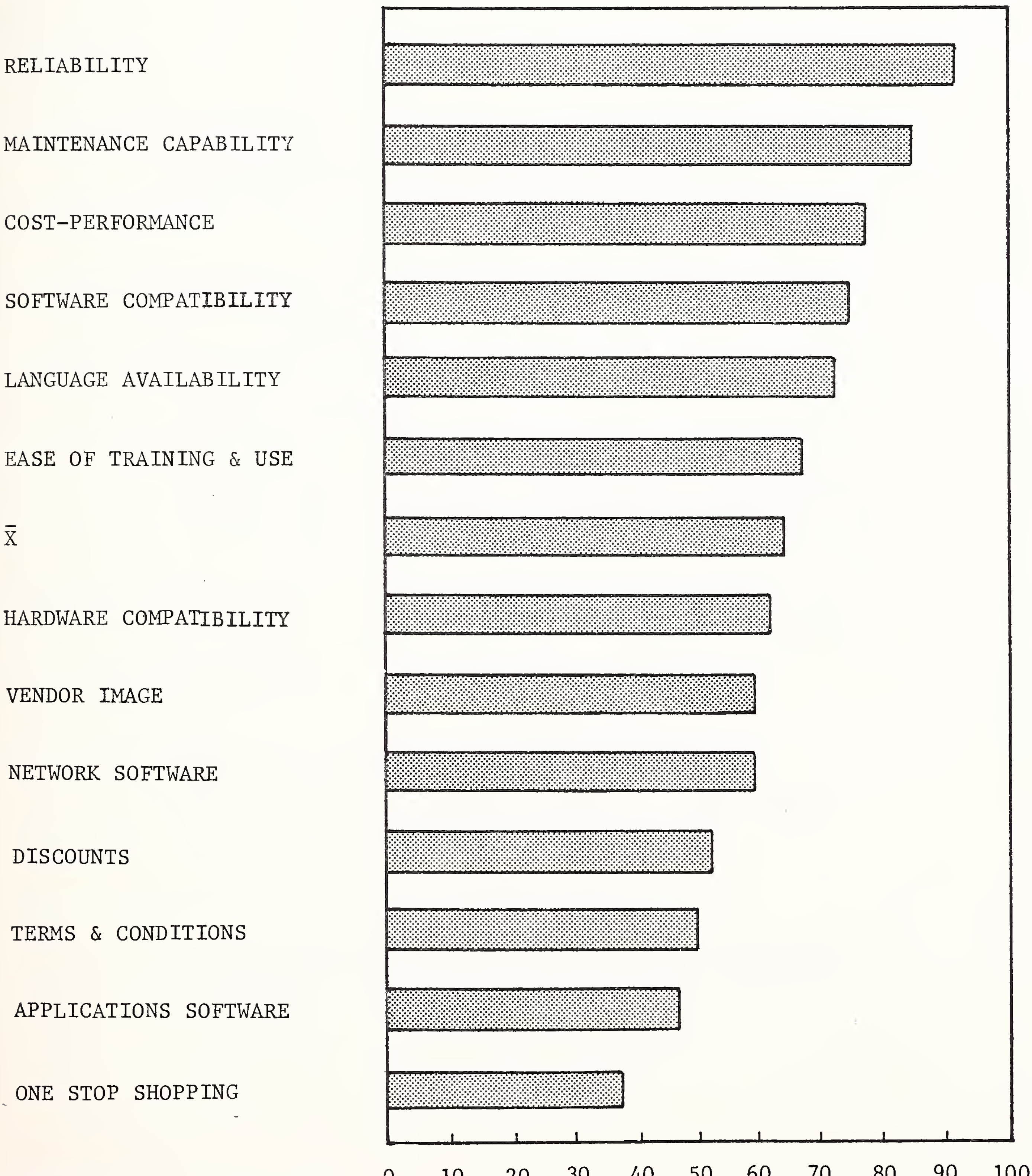
RECOMMENDATIONS

- DEAL WITH:
  - USER FEARS OF LOSING EDP CONTROL
  - MARKET IGNORANCE OF THE CONCEPT AND ITS IMPLEMENTATION
  - REINFORCING THE USER'S PERCEPTION THAT DDP HAS COST/PERFORMANCE BENEFITS

- DEVELOP A COORDINATED IBM CORPORATE POSTURE REGARDING DDP
  - BLUNT PROSPECTIVE USER CONFUSION THAT MAY BE DEVELOPING BETWEEN GSD AND DPD

- STRUCTURE A PRODUCT STRATEGY RECOGNIZING DDP EVOLUTION; I.E., STAR CONFIGURATIONS SEEM TO EVOLVE TO HIERARCHICAL
  - THERE MAY BE MARKET OPPORTUNITIES FOR RING NETWORKS WITHIN FUNCTIONAL DEPARTMENTS

RELATIVE IMPORTANCE* - VENDOR SELECTION CRITERIA



*IMPORTANCE = $(5-\bar{X}) \times 25$

RECOMMENDATIONS

- REFLECT THE VENDOR SELECTION CRITERIA IN THE FORMULATION OF A MARKETING STRATEGY

- DEVELOP A COMPLETE SYSTEMS ORIENTED PRODUCT FAMILY INCLUDING:

  - CLASS I SYSTEMS

  - REMOTE SITE TERMINALS OR SYSTEM CONTROLLERS TRANSPARENT TO THE USER; E. G., 3790

  - A COMMUNICATIONS NETWORK AND SYSTEMS DESIGN CAPABILITY

  - COMMUNICATIONS CONTROLLERS CAPABLE OF INTERFACING WITH HOST SYSTEMS; FOR EXAMPLE, THE 370X

- EMPHASIZE THE DEVELOPMENT OF A DBMS SOFTWARE PACKAGE

FORECASTS OF U. S. ALL VENDOR POTENTIAL AND SHIPMENTS

- DOMESTIC SHIPMENT RATE, 1977-1986 (UNITS):

	AVERAGE ANNUAL GROWTH RATE (PERCENT)
- CLASS I	25
- CLASS II	4
- CLASS III	4
- CLASS IV	15

- DDP GROWTH FOR CLASS I AND IV SYSTEMS

TOTAL U.S. SYSTEM SHIPMENTS AND BREAKOUT OF

THOSE SYSTEMS INVOLVED IN DDP

(K UNITS)

SYSTEM CLASS	YEAR											
	1977			1980			1983			1986		
	SHIPMENTS (SYSTEMS)	DDP ENVIRONMENT		SHIPMENTS (SYSTEMS)	DDP ENVIRONMENT		SHIPMENTS (SYSTEMS)	DDP ENVIRONMENT		SHIPMENTS (SYSTEMS)	DDP ENVIRONMENT	
		UNITS SYSTEMS	%		UNITS SYSTEMS	%		UNITS SYSTEMS	%		UNITS SYSTEMS	%
I	70	< 7	<10	150	15-30	10-20	270	40-70	15-25	500	100-175	20-35
II	3	<0.3	<10	4.0	<0.4	<10	4-5	<0.5	<10	4-5	<0.5	<10
III	2	<0.2	<10	2.5	<0.3	<10	2.7	<0.3	<10	3	<0.3	<10
IV	2.1	0.4-0.6	20-30	3.2	1-1.5	35-50	4.8	2-3	50-60	7.5	5-6	70-80

ENTERPRISE POPULATION-1977 (UNITS/INDUSTRY SEGMENT)

DDP SEG.	POT'L SEGS	NAME	MUE			SUE		GSD-2		UNITS
			A	B	C	D	E	F	G	
1	1-5	WHOLE-SALE	11,665	1,741	696			247	15	EMPLOYEES
2	14-22	RETAIL	7,394	933	576			258	58	EMPLOYEES
3	34,36, 38,40	PROC. w/o PETR.		1,332	949		42	466	101	EMPLOYEES
4	37	PETROL			144			55	25	EMPLOYEES
5	35	AERO/ MOT			67			81	38	EMPLOYEES
6	35	MACH/ FAB			390	541	88	534	84	EMPLOYEES
7	45,46	BANKS		1,180	233			179	15	ASSETS ($M)
8	63	SCHOOL DIST.		602						ENROLLMENT(K)
9	55	HOSPI-TALS	2,324	737	614					BEDS
10	65-67	CITY/ COUNTY			304			187		POPULATION(K)
11	41	MOT. FRT.			45			19		REVENUE ($M)
12	64	COL-LEGES			298			152		ENROLLMENT(K)

CELL 1A ILLUSTRATION

- WHOLESALE ENTERPRISES WITH 20 TO 99 EMPLOYEES

- 11,665 ENTERPRISES TIMES 60 EMPLOYEES PER ENTERPRISE $\frac{(20 + 99)}{2}$

- EQUALS 700,000 EMPLOYEES

CONVERSION FACTORS

DDP SEGMENT	INDUSTRY NAME	CONVERSION FACTOR
7	BANKS	1 EMPLOYEE PER $1.5 MILLION ASSETS
8	SCHOOL DISTRICTS	1 EMPLOYEE PER 15 PUPIL ENROLLMENT
9	HOSPITALS	3 EMPLOYEES PER BED
10	CITY/COUNTY	1 EMPLOYEE PER 50 POPULATION
11	MOTOR FREIGHT	1 EMPLOYEE PER $40,000 REVENUE
12	COLLEGES	1 EMPLOYEE PER 8 PUPIL ENROLLMENT

NUMBER OF EMPLOYEES PER DDP INDUSTRY SEGMENT CELL-1977 (THOUSANDS)

DDP SEG.	INDUSTRY NAME	MUE			SUE		GSD-2	
		A	B	C	D	E	F	G
1	WHOLESALE	700	298	438			1,375	180
2	RETAIL	444	158	360			1,419	1,200
3	PROC. w/o PETR.		390	712		32	2,563	4,600
4	PETROL			108			303	880
5	AERO/ MOT			50			446	2,550
6	MACH/ FAB			293	203	66	2,940	5,850
7	BANKS		216	117			656	305
8	SCHOOL DIST.		700					
9	HOSPITALS	1,380	884	1,842				
10	CITY/ COUNTY			1,064			2,244	
11	MOT. FRT.			84			95	
12	COLLEGES			279			285	

NUMBER OF EMPLOYEES PER DDP INDUSTRY SEGMENT CELL: (1977/1980/1983/1986) (MILLIONS)

DDP SEG.	INDUSTRY NAME	MUE			SUE		GSD-2	
		A	B	C	D	E	F	G
1	WHOLESALE	.70/.75/ .79/.84	.30/.32/ .34/.36	.44/.47/ .49/.53			1.38/1.46/ 1.55/1.65	.18/.19/ .20/.21
2	RETAIL	.44/.47/ .50/.53	.16/.17/ .18/.19	.36/.38/ .41/.43			1.42/1.51/ 1.60/1.70	1.20/1.27/ 1.38/1.43
3	PROC. w/o PETR.		.39/.41/ .44/.47	.71/.75/ .80/.85		.03/.03/ .04/.04	2.56/2.72/ 2.89/3.06	4.60/4.88/ 5.18/5.50
4	PETROL			.11/.12/ .12/.13			.30/.32/ .34/.36	.88/.94/ .99/1.05
5	AERO/ MOT			.05/.05/ .06/.07			.45/.48/ .51/.55	2.55/2.70/ 2.86/3.03
6	MACH/ FAB			.29/.30/ .32/.35	.20/.21/ .22/.23	.07/.07/ .08/.08	2.94/3.12/ 3.20/3.50	5.86/6.22/ 6.60/7.00
7	BANKS		.22/.23/ .24/.26	.12/.12/ .13/.14			.66/.70/ .74/.79	.31/.33/ .35/.37
8	SCHOOL DIST.		.70/.74/ .79/.84					
9	HOSPITALS	1.38/1.47/ 1.54/1.65	.88/.94/ 1.00/1.05	1.84/1.96/ 2.08/2.20				
10	CITY/ COUNTY			1.06/1.13/ 1.20/1.27			2.24/2.38/ 2.53/3.02	
11	MOT. FRT.			.08/.09/ .10/.10			.10/.10/ .11/.12	
12	COLLEGES			.28/.30/ .31/.33			.29/.30/ .32/.35	

POTENTIAL: NUMBER OF EMPLOYEES PER MINICOMPUTER/SBC (CLASS I)

(1977/1980/1983/1986)

DDP SEG	NAME	POPULATION/MINICOMPUTER/SBC			
		1977	1980	1983	1986
1	WHOLESALE	50	35	25	20
2	RETAIL	50	40	35	30
3	PROC. (W/O PET.)	35	30	25	20
4	PETROL	35	30	25	20
5	AERO/MOT	35	30	25	20
6	MACH/FAB	35	30	25	20
7	BANKS	50	40	25	20
8	SCH. DIST.	50	40	35	25
9	HOSPITALS	50	40	35	30
10	CITY/CTY	50	35	30	25
11	MOT. FRT.	35	30	25	20
12	COLLEGES	50	40	35	30

U.S. INDUSTRY FORECAST: MINI/SMALL BUSINESS

(CLASS: I) COMPUTER SYSTEMS ALL

VENDOR SHIPMENTS FORECAST [UNITS (K)]

INDUSTRY	*1977 POPULA- ION (M)	CLASS I SYSTEMS AAGR (%)	1977	1980	1983	1986
WHOLESALE	3.1	34	2	5	12	28
RETAIL	8.1	31	5	10	25	55
MANUFACTURING, PROCESS	10.4	25	17	35	65	125
MANUFACTURING, DISCRETE	11.3	23	22	45	75	140
FINANCE	1.1	38	1	3	7	20
HEALTH	3.3	32	2	5	10	25
EDUCATION	0.9	22	2	3	5	10
TRANSPORTATION	1.8	28	2	4	9	18
GOVERNMENT, LOCAL	3.5	26	<1	2	4	8

*1977 POPULATION IN ESTABLISHMENTS HAVING >20 EMPLOYEES

TOTAL U.S. COMPUTER SYSTEM: ALL VENDOR POTENTIAL AND ACTUAL SHIPMENTS

SYSTEM CLASS: I YEAR: 1977 [UNITS (K)/$(M)]

DDP SEG.	INDUSTRY NAME	MUE						SUE				GSD-2			
		A		B		C		D		E		F		G	
		POT.	SHIP.	POT.	SHIP.	POT.	SHIP.	POT.	SHIP.	POT.	SHIP.	POT.	SHIP.	POT.	SHIP.
1	WHOLESALE	14/490	0.5/17.5	6/210	0.2/7.0	9/315	0.3/10.5					27/945	1.0/ 35.0	4/140	0.1/3.5
2	RETAIL	9/315	0.3/10.5	3/105	0.1/3.5	7/245	0.2/7.0					28/980	0.8/ 28.0	24/840	0.7/ 24.5
3	PROC. w/o PETR.			11/385	0.7/ 24.5	20/700	1.2/ 42.0			1/35	0.05/ 1.8	73/ 2555	4.4/ 154.0	131/ 4585	7.8/ 273.0
4	PETROL					3/105	0.2/7.0					9/315	0.5/17.5	25/875	1.5/ 52.5
5	AERO/ MOT					1/35	0.1/3.5					13/455	0.9/31.5	73/ 2555	5.0/175.0
6	MACH/ FAB					8/280	0.6/21.0	6/210	0.4/ 14.0	2/70	0.1/3.5	84/ 2950	6.0/ 210.0	167/ 5845	11.8/ 413
7	BANKS			4/140	0.2/7.0	2/75	0.1/3.5					13/455	0.7/24.5	6/210	0.3/10.5
8	SCHOOL DIST.			14/490	1.4/ 49.0										
9	HOSPITALS	28/980	0.8/28.0	18/630	0.5/17.5	37/ 1295	1.1/ 39.0								
10	CITY/ COUNTY					21/ 735	0.6/ 21.0					45/1575	1.1/ 39.0		
11	MOT.FRT.					2/8	0.1/3.5					3/105	0.1/3.5		
12	COLLEGES					6/210	0.5/17.5					6/210	0.6/21.0		

DDP PROPENSITY INDEX: MINI/SBC

(1977-1980-1983-1986) (1= <10% DDP ENVIRONMENT; 10=90-100% DDP ENVIRONMENT)

DDP SEG.	INDUSTRY NAME	MUE			SUE		GSD-2	
		A	B	C	D	E	F	G
1	WHOLESALE	1-1-2-2	1-1-2-2	1-1-2-2			1-1-2-2	1-2-2-2
2	RETAIL	1-1-2-3	1-2-2-3	1-2-2-3			1-2-3-4	2-2-3-4
3	PROC. w/o PETR.		1-2-2-3	2-2-3-3		2-2-3-3	2-3-3-3	2-3-3-4
4	PETROL			2-2-3-3			2-3-3-3	2-3-3-4
5	AERO/ MOT			1-2-2-3			2-2-2-3	2-2-3-4
6	MACH/ FAB			1-2-3-3	1-2-2-3	1-2-3-3	2-2-3-3	2-3-3-4
7	BANKS		1-2-2-3	2-2-3-4			2-3-3-3	2-3-4-4
8	SCHOOL DIST.		1-1-2-2					
9	HOSPITALS	1-1-2-2	1-1-2-3	1-2-2-3				
10	CITY/ COUNTY			1-2-2-2			1-2-2-3	
11	MOT. FRT.			1-2-2-2			1-2-2-2	
12	COLLEGES			2-2-2-3			2-3-3-3	

PROPENSITY OF THE USER TO EMBRACE
DDP AS PERCEIVED BY THE INTERVIEWER:
1977, 1980, 1983, 1986
RATING: 1-LOWEST; 10-HIGHEST (RATE/RANK)

DDP SEG	INDUSTRY NAME	1977	1980	1983	1986
1	WHOLESALE	1/12	1/12	1/12	2/12
2	RETAIL	2/7	2/7	3/6	5/5
3	PROCESS w/o PETR.	3/5	3/5	4/3	5/3
4	PETROL	3/4	4/3	4/2	5/2
5	AERO/MOT	2/6	2/6	3/7	4/7
6	MACH./FAB.	3/3	3/4	4/4	5/4
7	BANKS	3/2	3/1	4/1	5/1
8	SCHOOL DISTRICT	2/8	3/8	3/8	4/8
9	HOSPITALS	1/9	1/9	2/10	3/10
10	CITY/CTY	1/10	2/10	2/9	3/9
11	MTR. FRT.	1/11	1/11	2/11	2/11
12	COLLEGES	3/1	3/2	4/5	4/6

ALL VENDOR DDP SHIPMENTS [UNITS (K)] SYSTEM CLASS: I YEAR: 1977

DDP SEG.	INDUSTRY NAME	MUE			SUE		GSD-2	
		A	B	C	D	E	F	G
1	WHOLESALE	.03	.01	.01			.05	.01
2	RETAIL	.02	.01	.01			.04	.04
3	PROC. w/o PETR.		.04	.18		.01	.70	1.20
4	PETROL			.03			.08	.23
5	AERO/ MOT			.01			.05	.30
6	MACH/ FAB			.03	.02	.01	.30	.60
7	BANKS		.01	.02			.10	.05
8	SCHOOL DIST.		.07					
9	HOSPITALS	.04	.02	.05				
10	CITY/ COUNTY			.03			.05	
11	MOT. FRT.			.01			.01	
12	COLLEGES			.07			.09	

ALL VENDOR CLASS I SYSTEM POTENTIAL (AVP), SHIPMENTS (AVS) AND
DDP SHIPMENTS (AVDDP) BY DDP INDUSTRY SEGMENT GROUPINGS: 1977, 1980, 1983, 1986
(K UNITS)

DDP SEG	INDUSTRY	1977			1980			1983			1986			1977-1986 DDP AAGR
		AVP	AVS	AVDDP	AVP	AVS	AVDDP	AVP	AVS	AVDDP	AVP	AVS	AVDDP	
1	WHOL	60	2.1	0.11	90	4.8	0.27	136	11.7	1.75	181	26.9	3.90	49%
2	RET	71	2.1	0.12	96	4.2	0.58	118	8.9	2.00	141	23.6	7.57	58
3	PROC	236	14.2	2.13	294	28.2	6.77	375	53.9	13.32	497	106.2	32.47	35
4	PETROL	37	2.2	0.34	46	4.4	1.06	59	8.4	2.12	78	16.6	5.41	36
5	AERO/MOT	87	6.0	0.36	108	12.0	1.80	136	20.6	4.82	183	38.9	12.96	49
6	MACH/FAB	267	18.9	0.96	330	37.8	8.13	417	63.6	15.81	564	119.7	37.42	50
7	BANKS	25	1.3	0.18	35	3.4	0.73	59	9.0	2.27	79	23.2	5.68	47
8	SCHOOL	14	1.4	0.07	19	2.2	0.11	22	3.8	0.57	34	8.8	1.24	38
9	HOSPITALS	83	2.4	0.11	110	5.7	0.55	132	12.3	1.82	163	29.6	6.40	57
10	CITY/CTY	66	1.7	0.08	100	3.2	0.48	124	6.5	0.48	172	13.3	2.86	49
11	MOT. FRT.	5	0.2	0.02	6	0.4	0.06	8	0.8	0.12	11	1.8	0.27	34
12	COLLEGES	12	1.1	0.16	16	1.8	0.36	18	3.3	0.67	23	6.0	1.58	28
	TOTAL	963	53.6	4.64	1,240	108.1	20.84	1,604	202.8	46.25	2,126	414.6	117.68	43%

ALL VENDOR CLASS I SYSTEM POTENTIAL (AVP) SHIPMENTS (AVS) AND DDP SHIPMENTS (AVDDP)

BY ENTERPRISE SIZE GROUPING: 1977, 1980, 1983, 1986

(K UNITS)

ENTER GROUP	* SIZE	1977			1980			1983			1986			1977-1986 DDP AAGR
		AVP	AVS	AVDDP	AVP	AVS	AVDDP	AVP	AVS	AVDDP	AVP	AVS	AVDDP	
MUE	A	51	1.6	.09	70	3.5	0.18	90	7.9	1.16	113	19.1	3.09	48%
MUE	B	56	3.1	.16	76	6.0	0.52	98	12.1	1.80	130	27.7	4.84	46
MUE	C	116	5.0	.45	159	10.5	1.47	201	20.6	3.97	260	44.7	10.43	42
SUE	D	6	0.4	.02	7	0.8	0.12	9	1.4	0.21	12	2.6	0.65	47
SUE	E	3	0.2	.02	3	0.3	0.04	5	0.6	0.15	6	1.2	0.30	35
GSD2	F	301	16.1	1.47	399	32.5	5.77	515	61.7	14.16	699	126.6	31.22	40
GSD2	G	430	27.2	2.43	526	54.5	12.70	686	98.5	24.80	906	192.7	67.15	45
TOTAL		963	53.6	4.64	1,240	108.1	20.80	1,604	202.8	46.25	2,126	414.6	117.68	43%

*SEE EXHIBIT IV-2

ALL U.S. SYSTEM SHIPMENTS AND PERCENTAGE

IN DDP ENVIRONMENT: 1977, 1980, 1983, 1986

SYSTEM	1977		1980		1983		1986		AAGR 77-86
	SHIPS	% DDP	SHIPS	% DDP	SHIPS	% DDP	SHIPS	% DDP	
CLASS I	$ 2.5B	<10%	$ 5.0B	10-20	$ 9.5B	15-25	$17.0B	20-35	23%
CLASS II & III	2.2	<10%	2.5	<10%	2.7	<10%	3.0	<10%	4
CLASS IV	5.3	20-30	8.0	35-50	12.0	50-60	18.5	70-80	15
TOTAL	$10.0B	-	$15.5B	-	$24.2	-	$38.5	-	16%

PROJECTED PERCENTAGE HARDWARE BUDGET DISTRIBUTIONS

HARDWARE OR SYSTEM	1977	1980	1983	1986
• PROCESSORS AND MAIN-MEMORY (CLASS II, III, IV)	30%	27%	25%	25%
• PERIPHERALS	25	25	25	25
• MINI/SMALL BUSINESS COMPUTER SYSTEMS (CLASS I)	10	15	18	20
• TERMINALS AND DATA COMMUNICATIONS	35	33	32	30
TOTAL	100%	100%	100%	100%

PRICE/PERFORMANCE IMPROVEMENT
FORECAST

SYSTEM CLASS	1977	1980	1983	1986	AVERAGE ANNUAL IMPROVEMENT
I	1.0	1.5	2.3	3.5	15%
II	1.0	1.7	3.0	5.2	20
III	1.0	1.7	3.0	5.2	20
IV	1.0	2.0	3.8	7.5	25

WHOLESALE

OVERVIEW

- SMALL TO MEDIUM SIZED BUSINESSES
  - FAMILY OWNED
  - RESISTANT TO CHANGE
  - "UNIQUE"
- LOW ROI
- LOW PROFIT MARGIN
- HEAVY OPERATING PRESSURES
- MANY INTERVIEW REFUSALS
- VERY LOW USE OF DDP
- JUST BEGINNING CENTRAL ON-LINE DATA ENTRY
- 5 TO 10 YEARS BEHIND THE STATE-OF-THE-ART

HOW EXPERIENCED IS THE MARKET?

- RANKS LAST IN DDP SENSITIVITY

- CONFUSED DDP WITH CRTS

- TWO-THIRDS OF DATA PROCESSING MANAGERS HAVE LESS THAN 8 YEARS EXPERIENCE

- LITTLE PLANNING

- "DDP TOO SOPHISTICATED FOR US"

MANAGEMENT AND ORGANIZATION IMPACT

- GEOGRAPHIC BRANCH MANAGERS REPORT TO HEADQUARTERS VICE PRESIDENT, SALES

- DATA PROCESSING CENTRAL UNDER CHIEF FINANCIAL OFFICER

- PRESIDENT OFTEN SOLE IMPETUS TO DDP

- NEGATIVE: "IT'S TOO HARD TO BUCK ANTI-DDP IDEAS"

- "NO CHANGE IN DDP PHILOSOPHY UNTIL CORPORATE MANAGEMENT CAN PUT TOGETHER A LONG RANGE PLAN"

CURRENT AND ANTICIPATED APPLICATIONS

- ORDER ENTRY, ORDER ENTRY, ORDER ENTRY!
- BILLING, INVENTORY CONTROL, ACCOUNTS RECEIVABLE
- NOT MUCH THOUGHT BEYOND THE ABOVE
- VERY FEW INDUSTRY-SPECIFIC APPLICATIONS OR PLANS EXCEPT FOR THE LARGEST COMPANY INTERVIEWED
- NO SENSITIVITY TO WORD PROCESSING

JUSTIFICATION FOR DDP

- FASTER CUSTOMER SERVICE

- SURVIVAL FACTOR

  - "DROWNING IN CUSTOMERS"

- "POSSIBLE TOTAL PAYBACK IN LESS THAN ONE YEAR"

  - ELIMINATE 15-DAY LAG IN RECEIVABLES

- COST FACTORS NOT AS IMPORTANT AS SURVIVAL

WHY NOT DDP?

- NON-DDP FIRMS FELT COSTS WERE TOO HIGH
- TIME SENSITIVITY IS LOW
- NOT WORRIED ABOUT LOSS OF DATA BASE FOR 3-4 DAYS
- MOST FREQUENT REPLACEMENT IS DDE; NO DDE = NO DDP
- "WE ARE TOO SMALL" (400 EMPLOYEES)
- "STAFF AT REMOTES HAD TROUBLE ADAPTING TO ACCOUNTING MACHINES"
- "EASIER TO MAIL AND PROCESS CENTRALLY"

DISTRIBUTED DATA BASES - TRADE OFFS AND TRENDS

- ALL FIRMS EXCEPT FOR THE LARGEST INTERVIEWED PLAN ON DISTRIBUTED DATA BASES
  - REDUNDANT SUBSET
  - DOWNLOADED, NIGHTLY UPDATED
- JUSTIFICATION: LOWER COMMUNICATIONS COST, MORE TIMELY AND ACCURATE DATA
- INVENTORY AND CUSTOMER FILES
- REMOTE STORAGE REQUIREMENTS:
  - 1-100 MEGABYTES,
  - 15-27 MEGABYTES TYPICAL
- "NO PROBLEMS" WITH COMMUNICATIONS
- DDB PARTIAL SOLUTION TO "NO BACKUP" PROBLEM

VENDOR CHARACTERISTICS

- RELIABILITY AND MAINTENANCE IS THE KEY
- VENDOR IMAGE AND VIABILITY SCORED MUCH HIGHER THAN AVERAGE
  - IBM, HEWLETT-PACKARD, DATAPOINT, FOUR PHASE
- ONE-STOP SHOPPING WAS ALSO RANKED MUCH HIGHER THAN AVERAGE
- APPLICATIONS SOFTWARE REQUIREMENTS ARE VERY LOW
- WHOLESALERS BELIEVE THEIR BUSINESS IS UNIQUE:
  - LARGE NUMBER OF PRODUCTS
  - COMPLEX PRICING
  - DIRECT BILLING
  - EACH INDUSTRY SUB-SECTOR IS DIFFERENT

THE FUTURE FOR DDP IN WHOLESALING

- THE REMOTE ROLE IS LARGELY PASSIVE
- CONSIDERED A CLERICAL FUNCTION
- REMOTE SITES SUFFER FROM HIGH WORKLOAD
  - HOST DESIRES TO PROVIDE BETTER SERVICE
  - MAY BE ONE OF FEW SITUATION WHERE SELLING AT REMOTE MAKES SENSE
- MAJORITY OF WHOLESALE MUST BE SOLD AT HOST
  - PRESIDENT MORE IMPORTANT THAN DP MANAGER
- IF APPLICATIONS SOFTWARE IS OFFERED, MUST BE EASILY CUSTOMIZED
  - NOT INTERESTED IN "GENERAL PURPOSE WHOLESALE" PACKAGES
- NO OFFICE AUTOMATION ANTICIPATED

RETAIL

INPUT

OVERVIEW AND CONCLUSIONS

- RETAIL MORE ADVANCED THAN WHOLESALE WITHIN DISTRIBUTION
  - RELATIVELY AVERAGE VIS-A-VIS OTHER INDUSTRY SECTORS
- POTENTIAL FOR SHARP ACCELERATION (POST-1980S):
  - EFTS
  - POS
  - STATE REGULATION
  - COMPETITIVE PRESSURES

OVERVIEW AND CONCLUSIONS

- THE 1,000 TO 2,000 EMPLOYEE RANGE IS THE CURRENT BREAKPOINT FOR DDP IMPLEMENTATION WITHIN RETAILING

- INDUSTRY CHARACTERIZED BY A LOWER LEVEL OF DATA PROCESSING SOPHISTICATION AND IMPORTANCE

  - DAILY OPERATIONS ARE MOST IMPORTANT

- EXTREMELY STRONG CENTRALIZED CONTROL

- KEY DDP APPLICATIONS INCLUDE INVENTORY CONTROL, STORE REPLENISHMENT AND TREND INDICATIONS ON "HOT" SELLING ITEMS

- DEC, CLOSELY FOLLOWED BY IBM, ARE DDP PROPONENTS

  - IBM ALSO REGARDED AS MOST INHIBITING

DDP AWARENESS AND EXPERIENCE IN RETAILING

- THE CONCEPT IS WELL UNDERSTOOD AND IN VARYING STAGES OF IMPLEMENTATION WITHIN GSD-2 ENTERPRISES
  - PILOT INSTALLATION WITHIN THE NEXT YEAR
  - LIMITED CURRENT OPERATING EXPERIENCE

- MANY NON-DDP RESPONDENTS WITHIN GSD-1 ENTERPRISES COULD NOT DEFINE DDP

- REASONS FOR NOT EMPLOYING DDP:
  - ENTERPRISE TOO SMALL
  - FEAR OF LOSS OF CONTROL OVER DATA
  - MAINFRAME HAD NOT BEEN FULLY UTILIZED

MANAGEMENT/ORGANIZATIONAL INFLUENCE ON DDP

- STRONG CENTRALIZED CONTROL BORDERING ON AUTOCRACY
  - GSD-1 ENTERPRISES ARE FREQUENTLY FAMILY OWNED AND OPERATED
- CONVENTIONAL ORGANIZATIONAL STRUCTURES
- FREQUENT REPORTS OF PAST DATA PROCESSING DEBACLES
  - SUSPICIOUS SENIOR MANAGEMENT
- REMOTE USERS OVERWHELMINGLY DEFER TO HOST
  - NOT DATA PROCESSING PROFESSIONALS

CURRENT AND ANTICIPATED APPLICATIONS

- NO EVIDENCE OF NEW APPLICATIONS TO BE TRIGGERED BY DDP

- KEY DDP APPLICATIONS ARE INVENTORY RELATED WITH THE "TIME VALUE" OF INFORMATION CRITICAL

  - "HOT ITEMS"

  - RETAILING IS A DYNAMIC INDUSTRY DRIVEN BY RAPIDLY CHANGING CONSUMER PREFERENCES

- VERY LOW LEVEL OF WORD PROCESSING OR OFFICE SYSTEM TIE-IN

DDP JUSTIFICATION (OR ITS ABSENCE) IN RETAILING

- ANTICIPATED OPERATING BENEFITS WERE FREQUENTLY THE PRIMARY JUSTIFICATION ALTHOUGH:
  - PRICE PERFORMANCE
  - END USER INVOLVEMENT AND
  - INFORMATION TIMELINESS WERE FREQUENTLY MENTIONED

- MAINFRAME CAPACITY LIMITATIONS WERE CLEARLY AN ISSUE AMONGST GSD-2 ENTERPRISES

- DIFFICULT TO DISCERN HARD FINANCIAL ANALYSES DONE TO PROVIDE JUSTIFICATION
  - NO DDP OPERATING EXPERIENCE TO SPEAK OF

- IN ADDITION TO ARTICULATED REASONS FOR NON-DDP UTILIZATION CONSIDER:
  - IGNORANCE OF THE CONCEPT
  - DATA PROCESSING BEING SUSPECT AND OCCUPYING A LOWER PRIORITY IN SMALL RETAIL OPERATIONS

DISTRIBUTED DATA BASES AND COMMUNICATIONS

- ABOUT 50 PERCENT OF RETAIL RESPONDENTS WERE UNHAPPY WITH COMMUNICATIONS COST AND RELIABILITY
- THE GENERAL LEVEL OF RETAIL EXPERTISE WITH COMMUNICATIONS IS LOW
- DATA BASE DISTRIBUTION AND MANAGEMENT ISSUES WERE FREQUENTLY INTERPRETED TO MEAN "FILE" DISTRIBUTION AND UPDATE
- STATE REGULATORY ACTIONS COULD HAVE SOME IMPACT ON DDP/DBMS
- BACK-UP SYSTEMS ARE MANUAL OR COOPERATIVE HOST ARRANGEMENTS

KEY VENDOR ISSUES IN RETAILING

- RELIABILITY AND SERVICE ARE UBIQUITOUS
- "ONE STEP SHOPPING" CONCEPT AND VENDOR SUPPLIED APPLICATIONS SOFTWARE ARE RELATIVELY UNIMPORTANT EXCEPT AT THE VERY SMALL ENTERPRISE LEVEL
- REMOTE SITE USERS ARE SINGULARLY ILL-INFORMED ABOUT TECHNOLOGY OR PRODUCT OFFERINGS
- DEC AND IBM ARE REGARDED AS DDP PROPONENTS
    - IBM ALSO REGARDED AS NON-SUPPORTIVE DUE TO A LACK OF A VIABLE PRODUCT FAMILY

THE FUTURE FOR DDP IN RETAILING

- DDP EXPERIENCE TO DATE IS GENERALLY FAVORABLE
  - SYSTEMS ARE EVOLUTIONARY
- END USER AND SENIOR MANAGEMENT INVOLVEMENT IS CRITICAL
- DDP SALES/MARKETING STRATEGIES IN THE SHORT TERM SHOULD BE FOCUSED ON THE HOST
  - REMOTE PRODUCTS MUST BE TECHNICALLY TRANSPARENT TO THE USER
- THE RATE OF DDP ACCEPTANCE IN RETAILING PIVOTS ON THE FOLLOWING FACTORS:
  - POS/EFTS DEVELOPMENTS
  - REGULATORY ACTION
  - A COORDINATED PRODUCT/MARKET VENDOR STRATEGY
  - ADOPTION OF DDP AS A COMPETITIVE "WEAPON"
  - PROVE "COST/BENEFITS" = BETTER ASSET MANAGEMENT

PROCESS MANUFACTURING

OVERVIEW AND CONCLUSIONS

- DDP IS NOT WELL ADVANCED IN THE PROCESS INDUSTRY CELLS INVESTIGATED

- CONCEPT IS WELL UNDERSTOOD BUT:

  - BULK APPLICATIONS STILL AT HOST

  - ONLY MOST RUDIMENTARY DDP IMPLEMENTATIONS WERE ENCOUNTERED

  - NO SENSITIVITY TO OFFICE OR PROCESS CONTROL TIE-INS

- LOSS OF CONTROL IS A MAJOR CONCERN

- ENTERPRISES WITH LESS THAN 1,000 EMPLOYEES (BOTH SUES AND MUES) ARE NOT AGGRESSIVELY PUSHING DDP

- NONETHELESS THE POTENTIAL RATE OF DDP ACCEPTANCE COULD BE HIGH

  - STRONG SENSE OF AUTONOMY AT REMOTE SITES

PROCESS MARKET EXPERIENCE/EDUCATION WITH DDP

- LARGEST NUMBER (14) OF DDP ON-SITE INTERVIEWS
  - VERY LIMITED DDP OPERATING EXPERIENCE
  - LARGE COMPANIES IN THE VANGUARD
- GENERAL LEVEL OF DATA PROCESSING EXPERIENCE BELOW OTHER MANUFACTURING AREAS
- REMOTE SITE EQUIPMENT PERFORMING DATA ENTRY, INQUIRY AND COMPLETE APPLICATIONS PROCESSING
  - INTELLIGENT TERMINALS UP TO MINIS
- HEAVILY STAR ORIENTED CONFIGURATIONS

MANAGEMENT STYLE AND ORGANIZATION

- WIDE GEOGRAPHICAL PLANT DISPERSION SUPPORTS DECENTRALIZATION AND THE DDP CONCEPT
- STRONG SENSE OF OPERATING AUTONOMY AND DATA PROCESSING INDEPENDENCE AT REMOTE SITES
- DDP IS USED TO ESTABLISH CONTROL OVER NEWLY ACQUIRED COMPANIES
- SMALL COMPANIES ARE AUTOCRATIC

CURRENT AND ANTICIPATED APPLICATIONS

- HOSTS FOCUS ON ACCOUNTS RECEIVABLE, INVENTORY CONTROL AND ORDER ENTRY

- REMOTES ARE MORE PRODUCTION ORIENTED

  - PAYROLL

  - JOB COSTING

  - ENGINEERING/PRODUCTION/MRP

- LIMITED TIE-INS WITH PROCESS/OFFICE APPLICATIONS

- HEAVY EMPHASIS ON PRE-PROCESSING OF DATA EQUALS "THRESHOLD DDP"

DDP JUSTIFICATION

- PRO
  - BETTER USER SERVICE
  - COST/PERFORMANCE ADVANTAGES
  - REDUCE EXPENSIVE MAINFRAME USAGE
- CON
  - LOSS OF CONTROL
  - INCREASED COMPLEXITY
  - COST AND DIFFICULTIES OF MAINTENANCE
- WHY NOT DDP?
  - "MY COMPANY IS TOO SMALL"

DISTRIBUTED DATA BASES

- OVER 50 PERCENT OF RESPONDENTS HAVE OR WILL HAVE DISTRIBUTED DATA BASES
  - UPDATE FREQUENCY VARIES FROM DAILY TO TWO TO THREE TIMES PER MONTH
- MOST ACTIVE FILES ("80/20" RULE) REQUIRED AT REMOTE SITES
- DBMS SORELY NEEDED
  - MUST BE TRANSPARENT TO USERS
- FREQUENTLY VOICED CONCERNS OVER NETWORKING AND COMMUNICATIONS COSTS

DESIRED VENDOR CHARACTERISTICS

- CONSISTENT WITH TOTAL POPULATION SAMPLE
- VENDORS' PRODUCT PLANS SHOULD BE CAPABLE OF SUPPORTING USERS' GROWTH
- VENDOR SUPPLIED APPLICATIONS SOFTWARE RANKS LOW
- IBM (FOLLOWED BY HONEYWELL) WAS REGARDED AS MOST INFLUENTIAL IN PROMOTING DDP

THE FUTURE FOR DDP IN PROCESS MANUFACTURING

- END USER INVOLVEMENT IN THE EVOLUTION OF DDP IS VITAL
  - HE WILL PAY FOR DDP IN THE FUTURE
- A MORE PERSUASIVE CASE FOR DDP COST/BENEFITS MUST BE MADE
  - HARDWARE AND COMMUNICATION COSTS ARE UNCERTAIN
- MINIS WILL INCREASINGLY INTERFACE BETWEEN THE HOST AND DUMB TERMINALS THAT ARE NOW OPERATING ON-LINE
- STAR NETWORKS WILL EVOLVE TO HIERARCHICAL AND HYBRID CONFIGURATIONS

PETROLEUM

OVERVIEW AND CONCLUSIONS

- THE PETROLEUM INDUSTRY REPRESENTS ONE OF THE MORE ADVANCED AND RESPONSIVE AREAS TO THE DDP CONCEPT

- DDP HAS EVOLVED AS A SELF-SUFFICIENT FORM; FOR EXAMPLE, APPLICATIONS COMPLETELY PROCESSED AT REMOTE SITES

  - MORE POWERFUL REMOTE MACHINES ARE DESIRED

  - GREAT DEGREE OF AUTONOMY AT REMOTE SITES

- THE INDUSTRY IS RECEPTIVE TO TIE-INS

  - OFFICE AUTOMATION IS THE EXCEPTION

- FUNDING IS AVAILABLE FOR "COST/EFFECTIVE" DDP PRODUCTS THAT ARE USER ORIENTED AND EASILY INSTALLED

  - MORE INTEREST IN VENDOR SUPPLIED APPLICATIONS SOFTWARE

DDP EXPERIENCE IN THE PETROLEUM INDUSTRY

- EXTENSIVE EDP EXPERIENCE (15 TO 25 YEARS) AMONGST GSD-2 LEVEL DATA PROCESSING MANAGERS WITH GOOD DDP OPERATING EXPERIENCE

- A "TOP DOWN" APPROACH IS COMMON; FOR EXAMPLE, OFFLOAD THE HOST TO REMOTE SITE PROCESSORS

- GSD-1 RESEARCH STUDY EXPERIENCE WAS SIMILAR TO THAT IN OTHER INDUSTRIES

IMPACT OF ORGANIZATIONAL STYLE ON DDP

- OIL CORPORATIONS ARE FUNDAMENTALLY DECENTRALIZED:
  - EXPLORATION
  - PRODUCTION
  - REFINING
  - MARKETING
- DDP IS A NATURAL DEVELOPMENT
- MOST REMOTE SITES ARE IN TRANSITION FROM A PRE-PROCESSING TO A PRIMARY APPLICATIONS PROCESSING CENTER
  - A 370/165 AS A REMOTE?

DDP APPLICATIONS AND JUSTIFICATION IN PETROLEUM

- IN ADDITION TO THE USUAL ACCOUNTING APPLICATIONS THERE ARE:

  - SEISMIC

  - REFINERY MODELING

  - PROCESS CONTROL AND

  - PIPELINE MONITORING

- SYSTEM TIE-INS ARE WELL ACCEPTED EXCEPT FOR OFFICE AUTOMATION

- MINI-BASED SYSTEMS ARE REGARDED AS BEING "EASIER TO DEAL WITH" FOR REMOTE APPLICATIONS AND ARE MORE COST EFFECTIVE THAN A HOST

- COST-BENEFIT ANALYSES ARE WIDELY USED AND INCREASE IN DETAIL AND FORMALITY WITH INVESTMENT SIZE

DISTRIBUTED DATA BASES AND COMMUNICATIONS TRENDS

- GEOGRAPHIC AND MANAGEMENT DECENTRALIZATION SUPPORTS DDB

- DDB IS EASIER DUE TO A HIGH DEGREE OF FUNCTIONAL AND DATA EXCLUSIVITY AT REMOTE SITES

- HIGH SPEED NETWORKS ARE KEY DUE TO THE TRANSMISSION OF BULK DATA RATHER THAN TRANSACTION OR INTERACTIVE TRAFFIC

- PRINCIPAL CONCERN IS THE LACK OF STANDARDS FOR NETWORK MANAGEMENT

THE FUTURE FOR DDP IN THE PETROLEUM INDUSTRY

- THE OUTLOOK FOR DDP IS ATTRACTIVE

- THE END USER IS RELATIVELY SOPHISTICATED AND EXERCISES A HIGH DEGREE OF AUTONOMY

  - SUPPORTS A REMOTE "SELL" STRATEGY

- FUNDING IS USUALLY NOT AN ISSUE

  - DATA PROCESSING EXPENDITURES ARE SMALL IN RELATION TO OTHER CAPITAL INVESTMENTS

AEROSPACE AND AUTOMOTIVE INDUSTRIES

OVERVIEW AND CONCLUSIONS

- DDP IMPLEMENTATION IS LIMITED TO LARGE COMPANIES WITH SMALLER ENTERPRISES IN THE PLANNING STAGES
  - THE SMALL AUTOMOTIVE SUPPLIER IS EXTREMELY COST CONSCIOUS AND LIMITED IN DDP PLANNING
- THE HIGH DEGREE OF INTERDEPENDENCE WITHIN THESE INDUSTRIES INCREASES THE IMPORTANCE OF DEVELOPING DDP STANDARDS
- OPPORTUNITIES MAY EXIST FOR TURNKEY RING NETWORKS IN SHOP FLOOR CONTROL SYSTEMS
- SUBSTANTIAL INERTIA AT THE PLANT LEVEL MAY LIMIT DDP ACCEPTANCE

DDP EXPERIENCE AND SOPHISTICATION

- EDP EXPERIENCE WAS EXTENSIVE
- DDP DEFINITIONS AND IMPLEMENTATIONS CLEARLY FOCUS ON DISTRIBUTED MINIS
- GSD-1 ENTERPRISES, WHILE SOMEWHAT MORE DDP KNOWLEDGEABLE THAN THE TOTAL SAMPLE, ARE STILL MOVING SLOWLY

ORGANIZATIONAL AND APPLICATIONS ISSUES

- HIGHLY DECENTRALIZED AND SIMILAR TO PETROLEUM COMPANIES; HOWEVER, THE DATA PROCESSING FUNCTION SEEMS TO CARRY LESS WEIGHT
  - DATA PROCESSING IS SUBORDINATE TO THE REVENUE EARNING DEPARTMENT OR PLANT
- SMALL COMPANIES CONTINUE TO BE AUTOCRATIC
- HEAVY APPLICATIONS EMPHASIS IS PLACED ON INVENTORY AND PRODUCTION MANAGEMENT
- REMOTE SITES ARE QUITE INDEPENDENT WITHIN LARGE AERO/AUTO ENTERPRISES
  - SOME RESPONDENTS DESIRED TURNKEY SHOP FLOOR CONTROL SYSTEMS

DISTRIBUTED DATA BASES AND COMMUNICATIONS TRENDS

- HIGH RESISTANCE TO DISTRIBUTED DATA BASES DUE TO CONCERN OVER:

  - LOSS OF CONTROL THROUGH INTERNODAL DISTRIBUTION

  - A LACK OF DBMS

- PLANNED DISTRIBUTION OF DATA BASES AND SYNCHRONIZATION SIMILAR TO THE POPULATION SAMPLE

- SEVERAL RESPONDENTS DESIRED A SYSTEM DEVELOPMENT TOOL TO ENABLE NETWORK MODELING

- THE PREDOMINANT COMMUNICATIONS CONCERN IS THE RISK OF LOST OR LOW QUALITY DATA

THE FUTURE FOR DDP IN THE AERO/AUTO INDUSTRY

- USERS WILL PAY DDP EXPENSES

- DDP ACCEPTANCE IS PREDICATED UPON PROVING THAT COST/PERFORMANCE BENEFITS ARE REAL

  - THE AVAILABILITY OF "CHEAP" COMMUNICATIONS IS KEY

- GSD-2 ENTERPRISES ARE WHERE THE DDP ACTION WILL BE IN THE SHORT TERM

- THE AERO/AUTO INDUSTRY APPEARS TO BE THE LEAST ATTRACTIVE FOR DDP DEVELOPMENT WITHIN THE PROCESS AND MANUFACTURING GROUP

DISCRETE MANUFACTURING

MANAGEMENT KNOWLEDGE AND SENSITIVITY

- THE CRITICAL 1,000 EMPLOYEE LEVEL

- INTERVIEW SCHEDULING:

  - MUES GREATER THAN 1,000: ONLY ONE OF SEVEN CONTACTED ARE NOT PLANNING DDP

  - MUES LESS THAN 1,000: TWENTY-ONE OF TWENTY-SIX CONTACTED ARE NOT PLANNING DDP

- SUE NOT PLANNING DDP

- KNOWLEDGE ALSO VARIED ACCORDING TO SIZE, BUT ELECTRONIC DATA PROCESSING EXPERIENCE WAS NOT SIGNIFICANT

ORGANIZATIONAL IMPACT ON DDP IMPLEMENTATION

- FUNCTIONAL CENTRALIZATION DETERS DDP

  - PRIMARY ACTIVITIES AT LOCATION (E.G., SUES, NON-DDP)

    - ADMINISTRATIVE 90 PERCENT
    - MANUFACTURING 95 PERCENT
    - WAREHOUSING 70 PERCENT

  - PRIMARY ACTIVITIES AT LOCATION (DDP)

	MUES <1,000 (PERCENT)	MUES >1,000 (PERCENT)
• ADMINISTRATIVE	50	100
• MANUFACTURING	100	50
• WAREHOUSING	50	17

ORGANIZATIONAL IMPACT ON DDP IMPLEMENTATION

- FAMILY AND "ONE MAN" COMPANIES ARE DIFFICULT
  - TEND TOWARD CENTRALIZED CONTROL
  - CONSERVATIVE IN ACCEPTANCE OF TECHNOLOGY
  - DIRECTLY INVOLVED IN DECISION MAKING
- GEOGRAPHIC DECENTRALIZATION MORE IMPORTANT THAN FUNCTIONAL CONSIDERATION AT PRESENT

APPLICATIONS STRUCTURES

- TRADITIONAL CLASSIFICATIONS NOT SO IMPORTANT
- DDP APPLICATIONS ARE FOCUSED IN DATA AND ORDER ENTRY (OVER 70 PERCENT)
- "OPERATIONAL SYSTEMS" VERSUS PLANNING AND CONTROL
- HIGH DEGREE OF "TIE-IN" SYSTEMS (78 PERCENT)
- VENDOR APPLICATIONS PACKAGES NOT SIGNIFICANT FOR EITHER DDP OR NON-DDP
  - 57 PERCENT DEVELOPED THEIR OWN
  - ONLY ONE DDP USER EVIDENCED A PREFERENCE FOR VENDOR PACKAGES
  - 68 PERCENT OF NON-DDP USERS STATED VENDOR APPLICATION SOFTWARE WAS NOT IMPORTANT
  - ONLY 3 NON-DDP USERS OF 22 SAID VENDOR SUPPLIED APPLICATION SOFTWARE WOULD ENCOURAGE THEM TOWARD DDP
- FUNCTIONAL GENERAL PURPOSE APPLICATIONS DEVELOPMENT TOOLS APPEAR MORE IMPORTANT

DDP VENDOR SELECTION RATINGS-DISCRETE MANUFACTURING

QUESTION 21 & 22

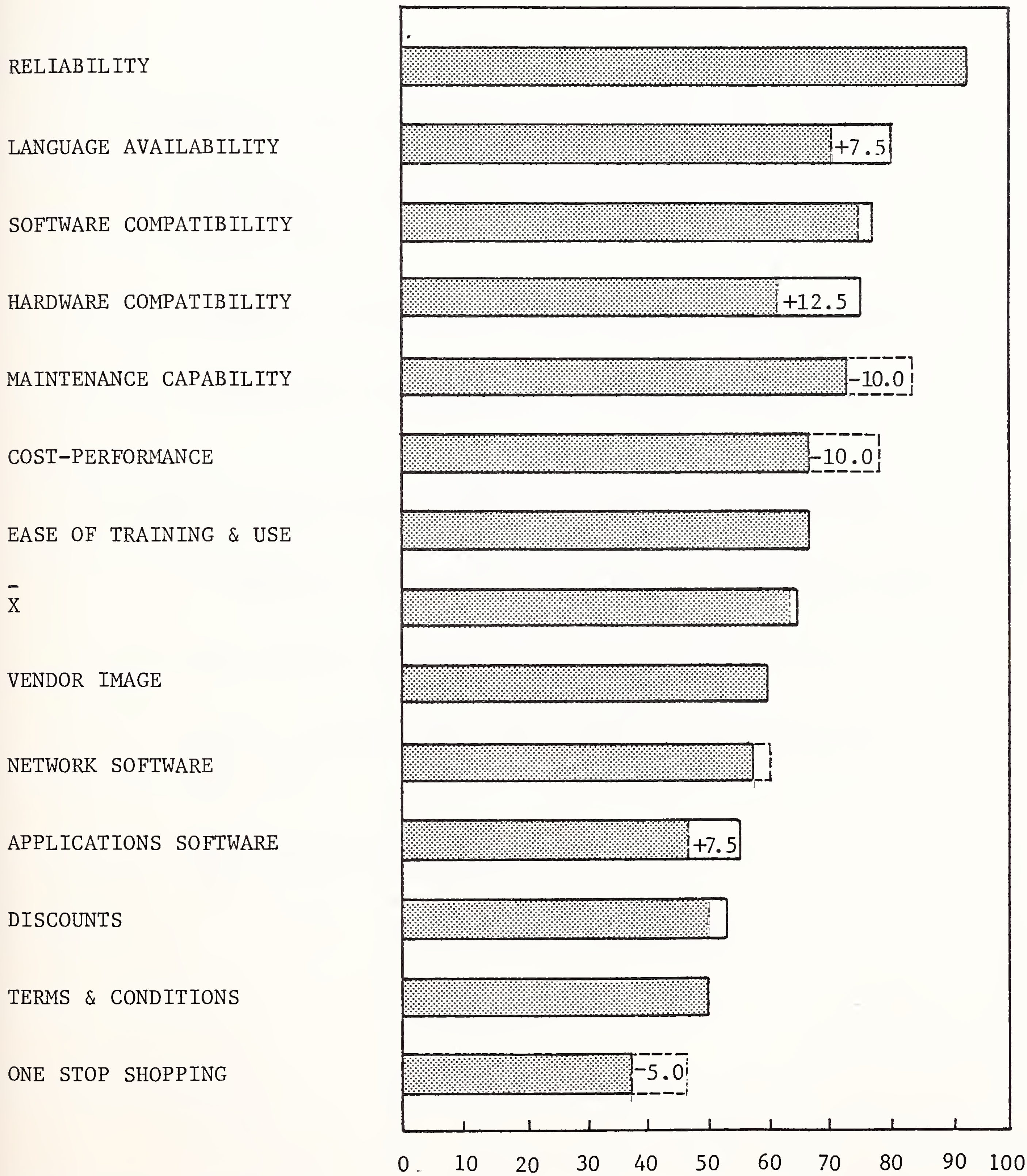
(MEAN RATINGS)*

FACTORS	DISCRETE MANUFACTURING	STUDY TOTALS
PRODUCT PRICE-PERFORMANCE	2.3	1.9
PRODUCT RELIABILITY	1.3	1.3
VENDOR IMAGE	2.6	2.6
MAINTENANCE CAPABILITY	2.1	1.7
EASE OF USE	2.3	2.3
DISCOUNTS	2.9	3 0
TERMS & CONDITIONS	3.0	3.3
ONE-STOP SHOPPING	3.5	3.3
HARDWARE COMPATIBILITY	2.0	2.5
LANGUAGE AVAIBILITY	1.8	2.1
APPLICATIONS SOFTWARE	2.8	3.1
SOFTWARE COMPATIBILITY	1.9	2.0
NETWORK SOFTWARE	2.7	2.6
FACTOR TOTALS	$\bar{x}$ = 2.4	$\bar{x}$ = 2.43

*BASED ON QUESTION RATINGS (1=CRITICAL, 5=UNIMPORTANT)

RELATIVE IMPORTANCE* - VENDOR SELECTION CRITERIA

DISCRETE MANUFACTURING



*IMPORTANCE = $(5-\bar{X}) \times 25$

JUSTIFICATION FOR DDP

- RESPONSIVENESS AND COST/PERFORMANCE ARE THE KEY
  - RESPONDENTS MENTIONED SAME FACTORS AS OTHER INDUSTRIES
  - HIGHER PERCENTAGE OF RESPONSE ON 6 MAJOR FACTORS
  - TIMELINESS OF REPORTING UNUSUALLY HIGH
- DATA PROCESSING MANAGEMENT "WANTS TO DISTRIBUTE"
  - "THANKLESS" FUNCTIONS (PRIORITIES, CLERICAL, ETC.)
  - DATA ENTRY RESPONSIBILITY (ALSO THANKLESS)
  - SHIFT EXPENSE FROM DATA PROCESSING BUDGET TO END USER
  - BUT, MAINTAIN CONTROL

JUSTIFICATION FOR DDP

- THE BASIC ASSUMPTIONS(S)
  - COST EFFECTIVE
  - MORE RESPONSIVE REPORTING (?)
  - BETTER DATA
- PROCEDURES FOR DDP JUSTIFICATION "NORMAL" AND COST JUSTIFICATION QUESTIONABLE, AS WITH OTHER INDUSTRIES

<u>COMMUNICATIONS AND DISTRIBUTED DATA BASES</u>

- NO SIGNIFICANT CONCERN ABOUT DDP COMMUNICATIONS
  - RELIABILITY
  - COST
    - AT ACCEPTABLE LEVELS <u>NOW</u>
- DATA BASES TO BE DISTRIBUTED - <u>"WHY NOT?"</u>
  - EVERYONE AGREES
  - BUT NOBODY KNOWS HOW MUCH OR WHAT
  - GENERAL PURPOSE DBMS - NOT ANSWER <u>NOW</u>!

COMMUNICATIONS AND DISTRIBUTED DATA BASES

- "INTERACTIVE" AND "BATCH" TRANSMISSION REQUIRED
- TODAY, DATA PROCESSING MANAGEMENT INSENSITIVE TO BACK-UP REQUIREMENT
  - PROCEDURES INADEQUATE (MAIL, MANUAL, ETC.)
  - 24-HOUR DOWN-TIME NOT IMPORTANT (?)
  - BUT MANAGEMENT EXPECTATION LEVELS WILL CHANGE!!!
- DISCRETE MANUFACTURING MORE THAN OTHER INDUSTRY SEGMENTS SEES COMMUNICATION TRENDS AS HAVING MAJOR IMPACT!

VENDOR SELECTION CRITERIA

- THE "NORMAL" DISTRIBUTION
  - MID-RANGE, REGARDLESS OF QUESTIONS
  - TENDENCY OF MEANS
  - GOOD CORRELATION OF POPULATION AND SAMPLE
- RATINGS VERIFY OPEN END QUESTIONS
- DISCRETE DEVIATIONS
  - CONVERSION AND COMPATIBILITY IMPORTANT
  - LESS SENSITIVITY TO MAINTENANCE AND PRICE/PERFORMANCE
- RELATIVE IMPORTANCE OF SELECTION CRITERIA
  - PRODUCT RELIABILITY - NUMBER ONE!
  - COMPATIBILITY
  - MAINTENANCE AND PRICE/PERFORMANCE
  - "EASE OF USE" AND "IMAGE"
  - SOFTWARE
  - SPECIAL ARRANGEMENTS
  - ONE-STOP SHOPPING??

FUTURE DDP DEVELOPMENTS IN DISCRETE MANUFACTURING

- NORMAL TREND TOWARD HIERARCHICAL AND HYBRID - WITH RING IN THE WINGS

- MANUAL AND BATCH SYSTEMS BEING REPLACED

  - HIGH PERCENTAGE OF MANUAL

  - PAPER IS A DIRTY WORD

  - OFFICE AUTOMATION IS RECOGNIZED AS A SIGNIFICANT FACTOR

FUTURE DDP DEVELOPMENTS IN DISCRETE MANUFACTURING

- NORMAL TREND TOWARD HIERARCHICAL AND HYBRID - WITH RING IN THE WINGS

- MANUAL AND BATCH SYSTEMS BEING REPLACED

  - HIGH PERCENTAGE OF MANUAL

  - PAPER IS A DIRTY WORD

  - COMPARATIVELY OFFICE AUTOMATION IS RECOGNIZED AS A SIGNIFICANT FACTOR

<u>FUTURE DDP DEVELOPMENTS IN DISCRETE MANUFACTURING</u>

- "ARCHITECTURAL" VERSUS GEOGRAPHIC DDP
  - CURRENTLY GEOGRAPHIC
  - "ARCHITECTURAL" AND FUNCTIONAL DDP
  - SUES MAY GO THIS WAY
  - ESTABLISHMENTS MAY GO THIS WAY
  - DISCRETE MAY BE ON THE FOREFRONT
- DISCRETE MANUFACTURING VARIES TREMENDOUSLY, BUT IT LENDS ITSELF TO DDP
  - TECHNICAL AWARENESS
  - AWARENESS OF COMMUNICATIONS
  - THE NEED IS THERE
  - THE COMPETITION IS THERE
  - "ARCHITECTURAL" <u>AND</u> GEOGRAPHIC
- A LARGE AND MOST PROMISING AREA !

BANKS AND SAVINGS AND LOAN ASSOCIATIONS

OVERVIEW AND CONCLUSIONS

- COMMERCIAL BANKS AND SAVINGS AND LOAN ASSOCIATIONS ARE PRIME USERS OF DDP

- NEARLY 70 PERCENT OF RESPONDENTS EITHER HAVE INSTALLED, OR ARE PLANNING TO INSTALL, DDP SYSTEMS

- BANKS AND SAVINGS AND LOAN ASSOCIATIONS WITH ASSETS OVER $2 BILLION ARE BEST TARGETS

- POTENTIAL IS STILL GOOD FOR BANKS WITH ASSETS BETWEEN $500 MILLION AND $2 BILLION

OVERVIEW AND CONCLUSIONS

- BRANCH BANKS AND MULTI-BANK HOLDING COMPANIES HAVING ASSETS OF AT LEAST $1 BILLION ARE USING DDP FOR:

  - TRANSACTION DATA CAPTURE

  - BRANCH CONSUMER OPERATIONS

- UNIT BANKS WITH ASSETS BELOW $1 BILLION ARE POOR TARGETS FOR DDP

- BANKS AND SAVINGS AND LOAN ASSOCIATIONS HAVE TURNED TO DDP BECAUSE BATCH ORIENTED MAINFRAMES ARE OVERLOADED:

  - DAILY CONSUMER INTERACTIVE SERVICES CONFLICT WITH LARGE BATCH OPERATIONS

  - TO OPEN THE "WINDOW" FOR BATCH PROCESSING

ASSET DISTRIBUTION OF BANKS INTERVIEWED ON-SITE

TYPE	ASSETS ($)				
	50M-499M	500M-1.9B	2.0B-9.9B	10B+	TOTAL
UNIT	0	0	1	0	1
BRANCH	1	2	2	2	7
MULTI-HOLDING	0	2	1	0	3
INTERNATIONAL	0	0	2	0	2
TOTAL	1	4	6	2	13

ASSET DISTRIBUTION OF BANKS AND SAVINGS AND LOAN ASSOCIATIONS CONTACTED

TYPE	ASSETS ($)									
	50M-499M	%	500M-1.9B	%	2.0B-9.9B	%	10B+	%	TOTAL	%
NUMBER CONTACTED	7	-	9	-	7	-	2	-	25	-
NUMBER INTERVIEWED (DDP)	1	-	4	-	6	-	2	-	13	-
NUMBER DECLINED WITH DDP	1	29	2	67	1	100	0	100	4	70
NUMBER WITHOUT DDP	5	71	3	23	0	0		0	8	30

BANKING EXPERIENCE WITH ELECTRONIC DATA PROCESSING

- BANK AND SAVINGS AND LOAN ASSOCIATION EXECUTIVES INTERVIEWED WERE ALL SENIOR PEOPLE AND WELL INFORMED:

  - OVER 90 PERCENT HAD 9 OR MORE YEARS EDP EXPERIENCE

  - NEARLY 70 PERCENT HAD 15 OR MORE YEARS EXPERIENCE

- RESPONDENTS DEFINED DDP IN THE CONTEXT OF A CENTRALIZED HOST CONTROLLING INTELLIGENT NODES

  - 48 PERCENT DEFINED DDP AS THE OFF-LOADING OF DATA ENTRY, DATA CAPTURE, AND SOME ON-LINE TELLER FUNCTIONS

  - 28 PERCENT MORE ADDED THE SHIFTING OF COMPUTATIONAL FUNCTIONS TO REMOTE SITES

  - 17 PERCENT COMPLETELY DECOUPLED DAILY CONSUMER TRANSACTION PROCESSING FROM THE MAINSTREAM OF BANK APPLICATIONS WHICH ARE BATCH

- IBM MAINFRAMES PREDOMINATED (90 PERCENT); HOWEVER, RESPONDENTS FELT IBM WAS "DRAGGING ITS FEET" WITH RESPECT TO DDP

MANAGEMENT ORGANIZATION AND IMPACT

- BANKS AND SAVINGS AND LOAN ASSOCIATIONS ARE HIGHLY CENTRALIZED ORGANIZATIONS

- VICE PRESIDENT (DIRECTOR) OF DATA PROCESSING (INFORMATION SYSTEMS) IS THE POINT OF CONTACT

- IN STRONG MULTI-BANK HOLDING COMPANIES VICE PRESIDENT OF DATA PROCESSING IS IN A SUBSIDIARY DATA SERVICES COMPANY

- IT IS POINTLESS TO SELL TO REMOTE SITES

  - HOLDS TRUE EVEN FOR INDIVIDUAL BANKS IN A HOLDING COMPANY

- BANKS AND SAVINGS AND LOAN ASSOCIATIONS EXERCISE VERY STRONG CENTRALIZED CONTROL OF SYSTEM DEVELOPMENT AND EQUIPMENT PROCUREMENT

INTERPLAY OF DDP AND BANK AND SAVINGS AND LOAN ASSOCIATION MANAGEMENT STYLE AND ORGANIZATIONAL STRUCTURE-TYPICAL COMMENTS

- "WE ARE A HOLDING COMPANY WITH 8 BANKS AND 120 BRANCHES. THE DATA PROCESSING IS HERE AT THE LEAD BANK. WE ARE SLOW IN GETTING OUR ACT TOGETHER BUT ARE MOVING IN THE DIRECTION OF INTEGRATING HOLDING COMPANY OPERATIONS.

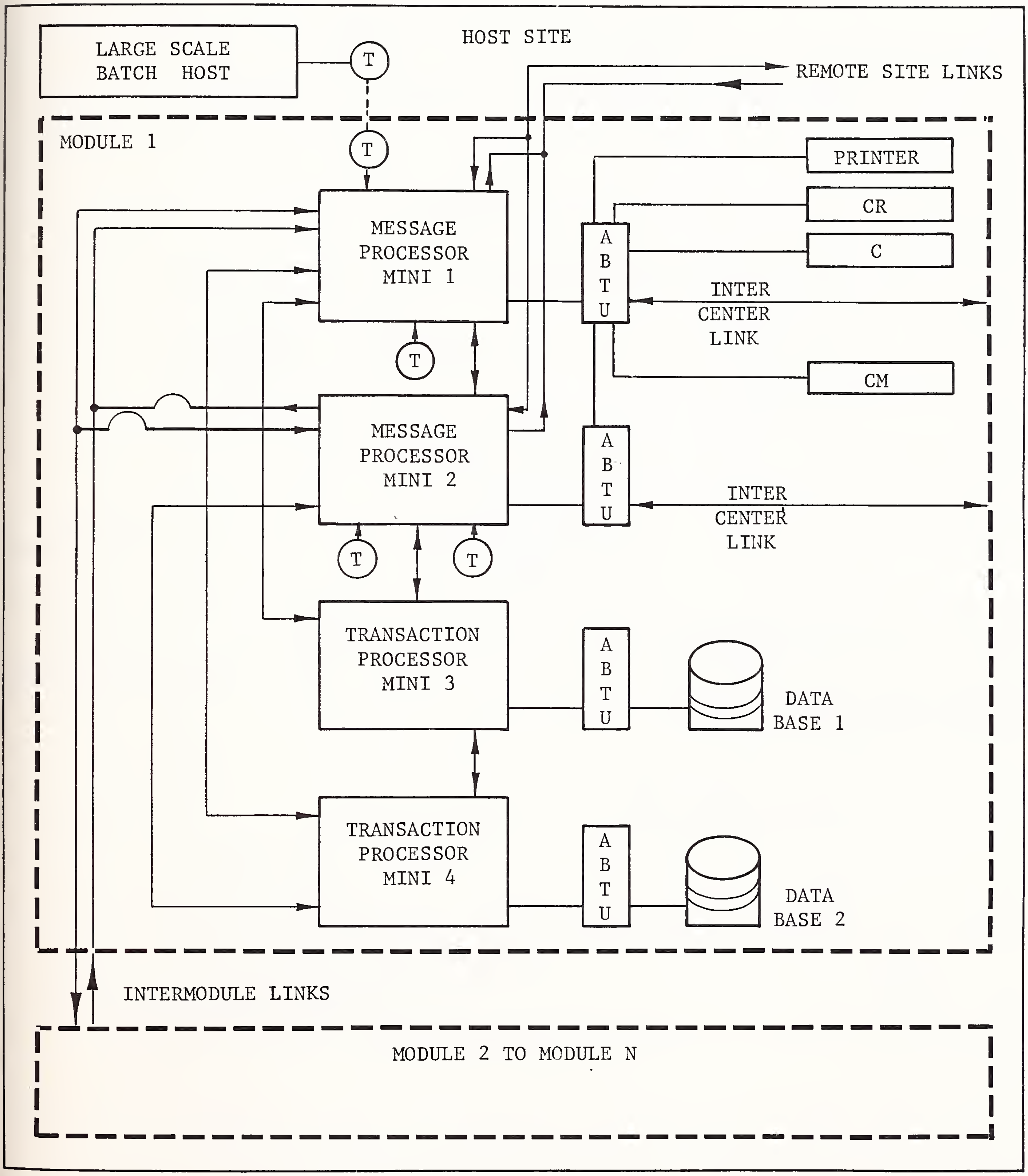
- "WE CURRENTLY DO LITTLE DDP. WE HAVE A SATELLITE SYSTEM DOING DATA CAPTURE. WE ARE IN THE PROCESS OF CENTRALIZING OUR PROOFING OPERATIONS. WE WILL THEN ESTABLISH TWO MORE SATELLITE CENTERS AND DISTRIBUTE DATA ENTRY."

- "WE ARE A VERY LARGE BANK WHICH YEARS AGO DECIDED TO EMPHASIZE CENTRALIZING OUR OPERATIONS. NOW WE ARE DISTRIBUTING EVERYTHING THAT DOESN'T IMPACT OUR APPLICATIONS PROGRAMMERS AND ALLOWS THE FUNCTION TO BE TRANSPARENT."

- "A CONSULTING COMPANY HAS RECOMMENDED THAT DDP REPORT DIRECTLY TO THE EXECUTIVE VICE PRESIDENT OF THE HOLDING COMPANY TO GAIN GREATER VISIBILITY IN IMPLEMENTING DDP."

FINANCE SECTOR
COMMERCIAL BANK (S&L) BRANCH CONSUMER TRANSACTION

DISTRIBUTED DATA PROCESSING- HOST SITE



ABTU-AUTOMATIC BUS TRANSFER UNIT
T -MAGNETIC TAPE(LOG)
CR -CARD READER

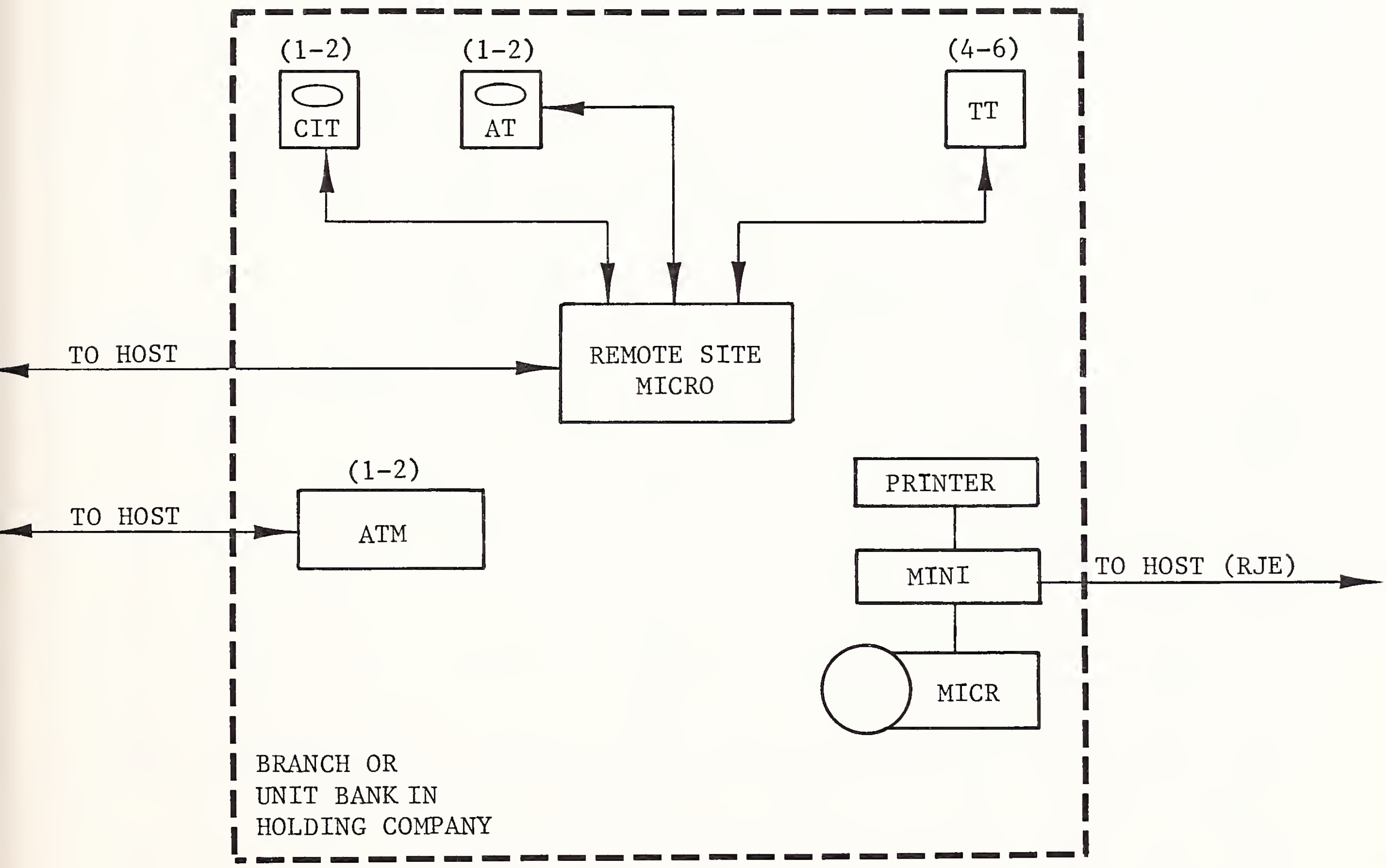
C -CONSOLE
CM -COMMUNICATION MONITOR MINI

FINANCE SECTOR

COMMERCIAL BANK BRANCH CONSUMER

TRANSACTION DISTRIBUTED DATA PROCESSING - REMOTE SITE

CURRENT SYSTEM



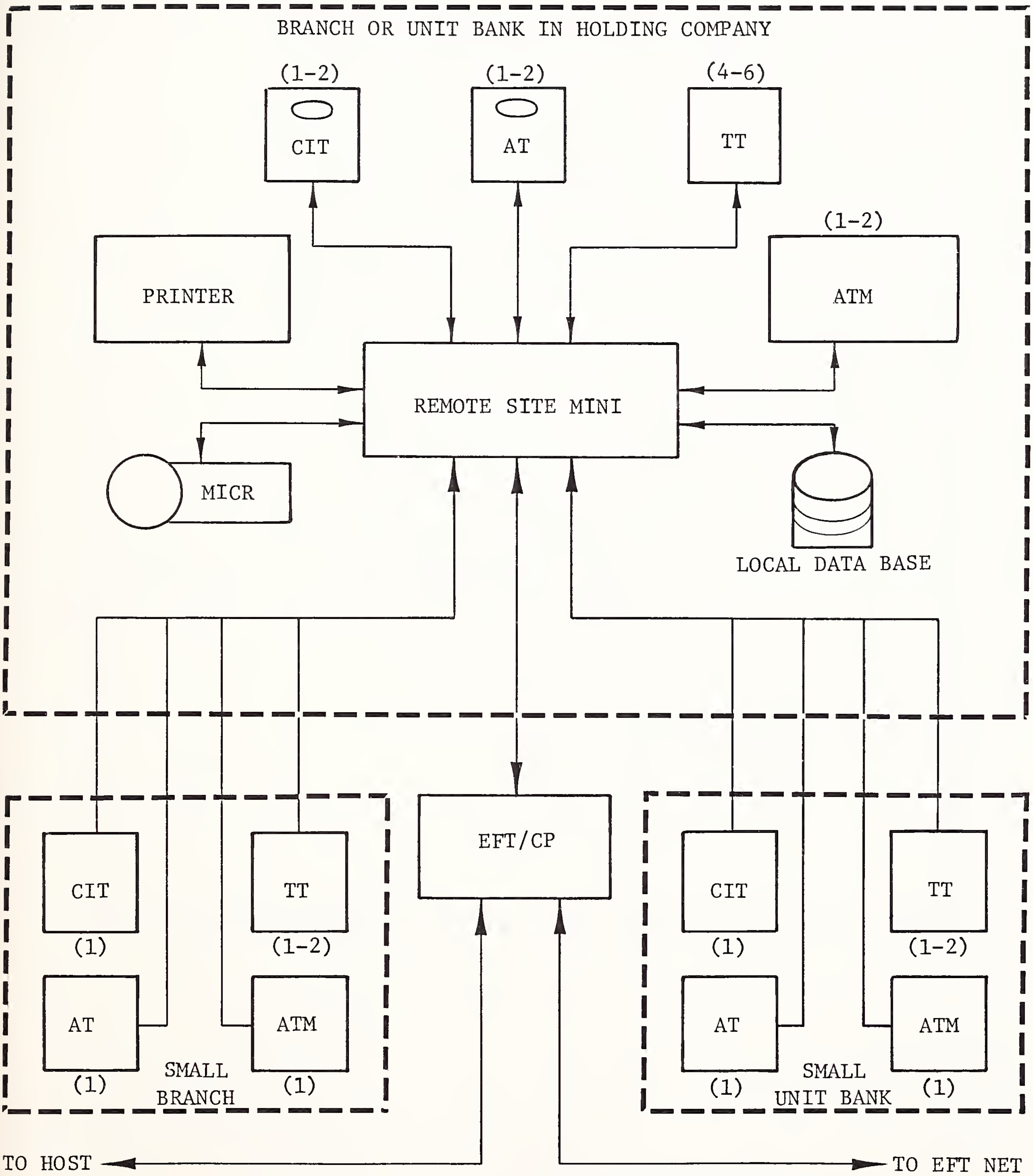
CIT-CUSTOMER INQUIRY TERMINAL
AT-ADMINISTRATIVE TERMINAL
TT-TELLER TERMINAL
ATM-AUTOMATED TELLER MACHINE

FINANCE SECTOR

COMMERCIAL BANK BRANCH CONSUMER

TRANSACTION DISTRIBUTED DATA PROCESSING - REMOTE SITE

FUTURE SYSTEM



AT-ADMINISTRATIVE TERMINAL
TT-TELLER TERMINAL

ATM-AUTOMATED TELLER MACHINE
CIT-CONSUMER INQUIRY TERMINAL
EFT/CP NETWORK/COMMUNICATIONS PROCESSOR

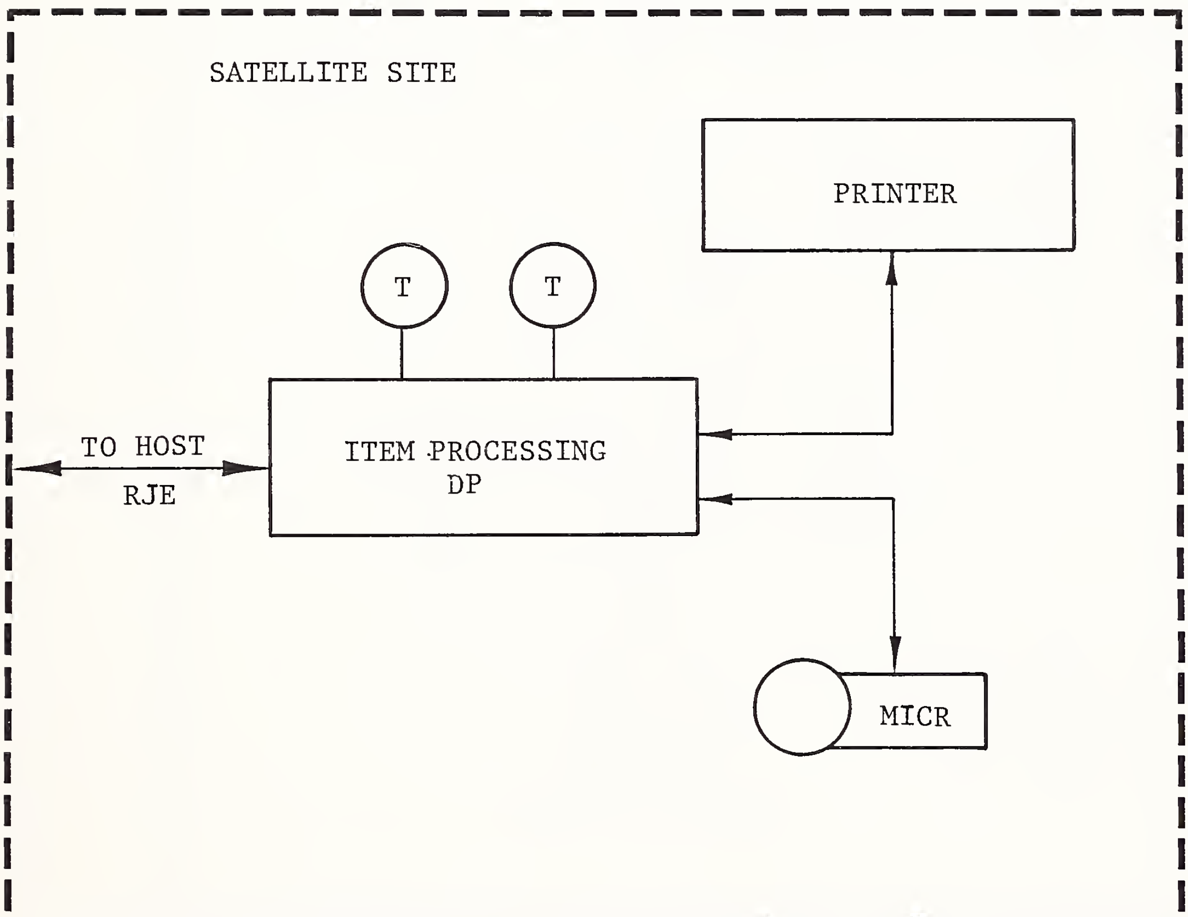
FINANCE SECTOR

COMMERCIAL BANK CONSUMER TRANSACTION

DISTRIBUTED DATA PROCESSING FOR CORRESPONDENT

DATA PROCESSING-SATELLITE SITE

CURRENT SYSTEM



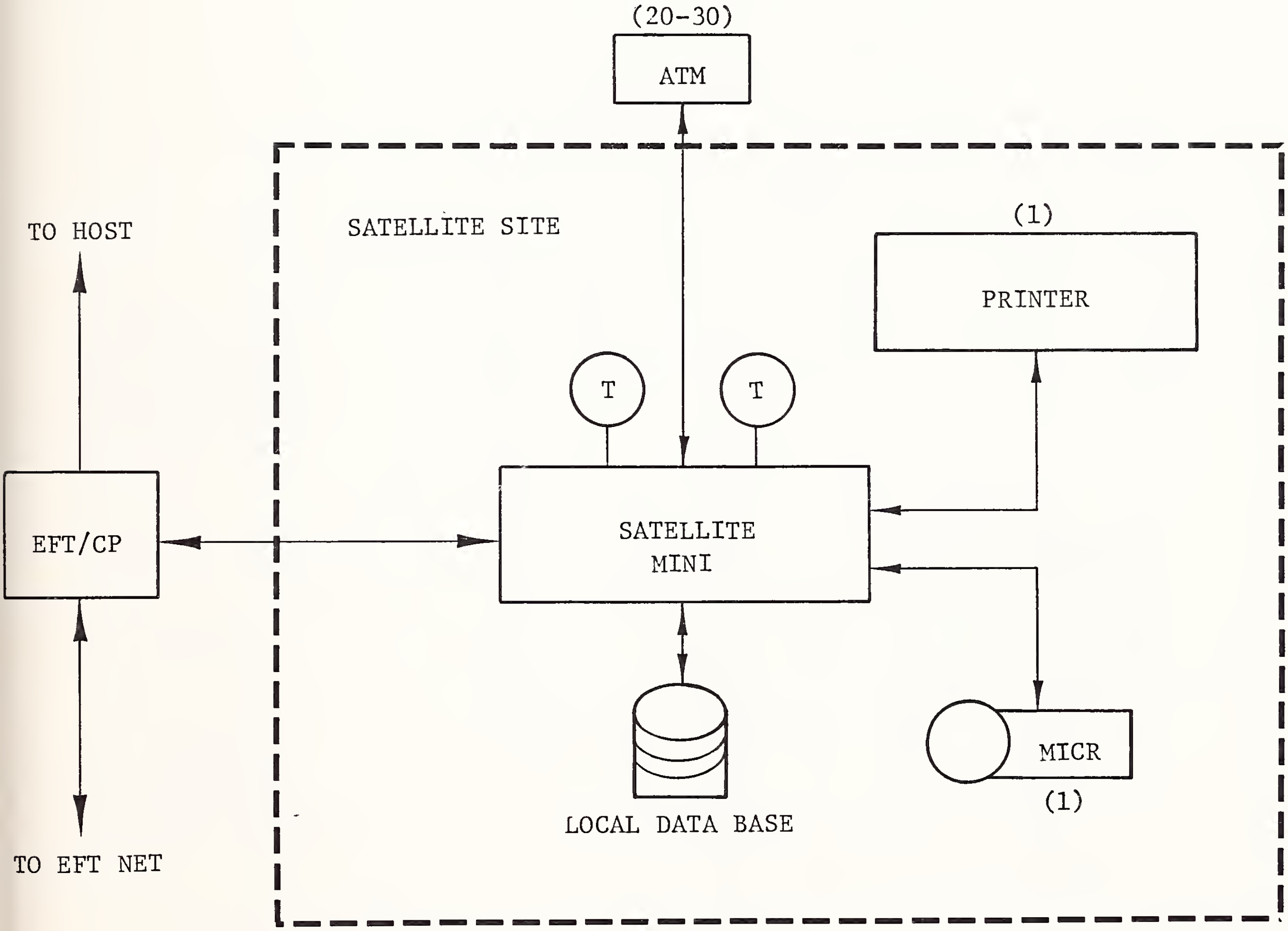
FINANCE SECTOR

COMMERCIAL BANK CONSUMER TRANSACTION

DISTRIBUTED DATA PROCESSING FOR CORRESPONDENTS

DATA PROCESSING - SATELLITE SITE

FUTURE SYSTEM



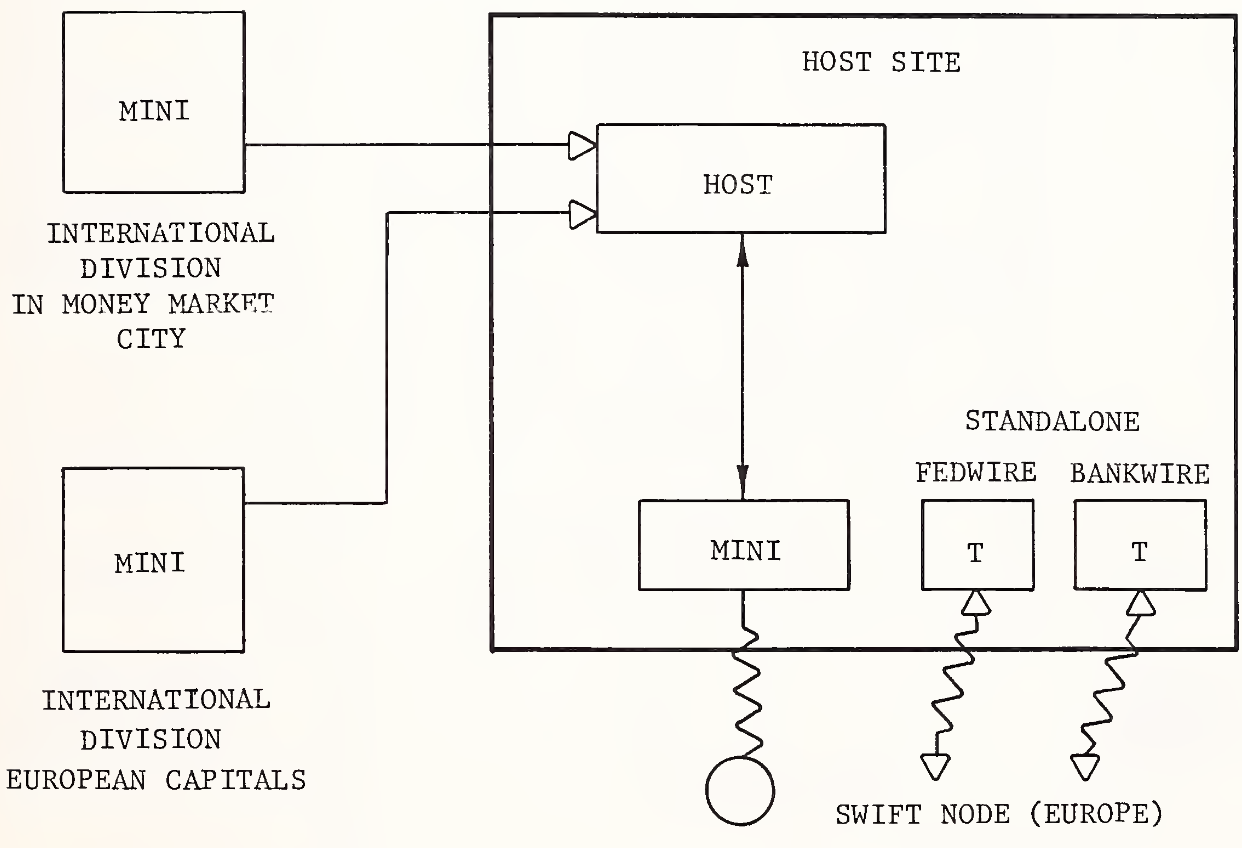
EFT/CP-ELECTRONIC FUND TRANSFER/COMMUNICATION PROCESSOR

FINANCE SECTOR

COMMERCIAL BANK INTERNATIONAL OPERATIONS

DISTRIBUTED DATA PROCESSING

CURRENT SYSTEM

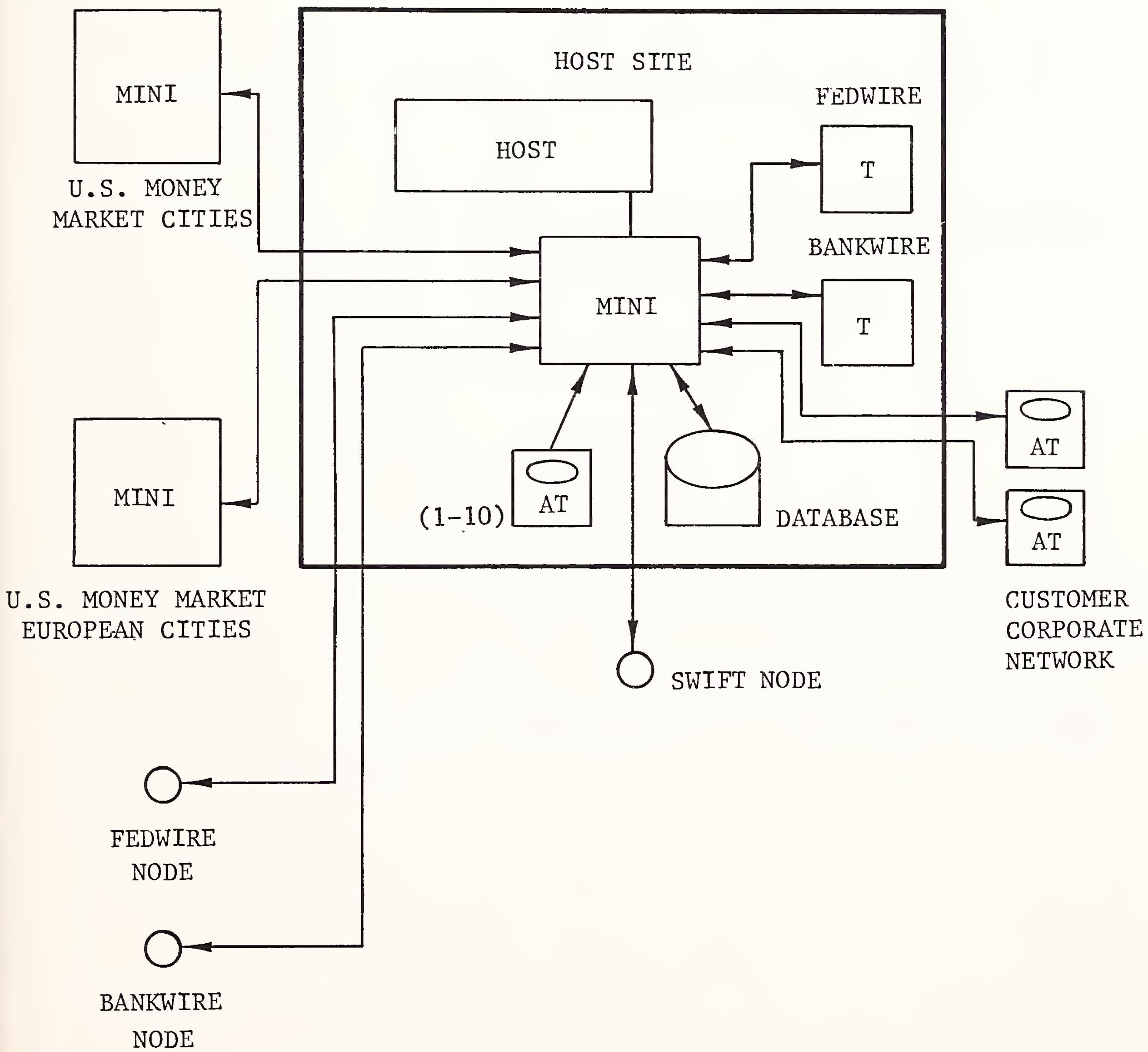


FINANCE SECTOR

COMMERCIAL BANK INTERNATIONAL OPERATIONS

DISTRIBUTED DATA PROCESSING

FUTURE SYSTEM



AT-ADMINISTRATIVE VIDEO TERMINAL

METHODS OF DDP SYSTEM SELECTION AND APPROVAL

- PRIMARY DECISIONS MADE WITHIN DATA PROCESSING (INFORMATION SYSTEMS)

- USERS' REQUIREMENTS ARE PROVIDED BY "STEERING COMMITTEE"

  - LARGE BANKS HAVE A STANDING COMMITTEE COMPRISED OF BRANCH VICE PRESIDENTS PLUS

    - BANK OPERATIONS OFFICER

    - ADMINISTRATIVE OFFICER

    - DATA PROCESSING (INFORMATION SYSTEMS) OFFICER

  - BOARD OF DIRECTORS (MEMBER BANK PRESIDENTS) OF DATA SERVICES SUBSIDIARY OF MULTI-BANK HOLDING COMPANIES

METHODS OF DDP SYSTEM SELECTION AND APPROVAL

- VERY LARGE BANKS DEVELOP DDP REQUIREMENTS AS PART OF THEIR PLANNING CYCLE (FIVE YEARS)

  - DATA PROCESSING MANAGER MAKES ALL DECISIONS (EXCEPT CAPITAL EXPENDITURES GREATER THAN $0.5 MILLION)

  - IN SAVINGS AND LOAN ASSOCIATIONS, ENTIRE RESPONSIBILITY IS VESTED IN DATA PROCESSING EXECUTIVE

- PRESSURES OF CONSUMER MARKET PLACE UNDERLIES (AT TIMES OVERRIDES) DDP COST JUSTIFICATION. METHODS EMPLOYED BY LARGE MONEY CENTER BANKS AND VERY LARGE SAVINGS AND LOAN ASSOCIATIONS RIPPLES DOWN THROUGH THE MARKET PLACE:

  - 24-HOUR CONSUMER SERVICE

  - ON-LINE CONSUMER TRANSACTION SYSTEMS

DISTRIBUTED DATA BASES AND COMMUNICATIONS
TRENDS AND TRADEOFFS

- BANKS AND SAVINGS AND LOAN ASSOCIATIONS HAVE HIGHLY CENTRALIZED DATA BASES. ABOUT HALF OF THE RESPONDENTS INTENDED TO DISTRIBUTE DATA BASES:
  - DATA BASE DOWN LINE LOADED FROM HOST
  - REFRESHED DAILY
  - "MEMO POSTING" OF CONSUMER TRANSACTIONS IS USED FOR DATA BASE MANAGEMENT

- BANKS ARE SHIFTING TO ON-LINE OPERATIONS (VERSUS BATCH) FOR DATA TRANSMISSION:
  - RESPONDENTS REPORTED SHIFT FROM 18 PERCENT IN 1977 TO 32 PERCENT BY 1982

- FOREIGN EXCHANGE AND CORPORATE FUNDS TRANSFER ARE THE "HOT BUTTONS" FOR LARGE MONEY CENTER BANKS WITH RESPECT TO DATA COMMUNICATIONS RELIABILITY

DISTRIBUTED DATA BASES AND COMMUNICATIONS TRENDS AND TRADEOFFS

- BANKS AND SAVINGS AND LOAN ASSOCIATIONS HAVE FEW CONCERNS ABOUT DATA COMMUNICATIONS
  - THE EXCEPTIONS ARE THE VERY LARGE MONEY CENTER BANKS
  - LITTLE DESIRE FOR VANS
  - MORE THAN 80 PERCENT FELT THEY COULD OPERATE FOR OVER 10 HOURS WITHOUT DATA COMMUNICATIONS

MARKETING AND TECHNICAL REQUIREMENTS

- IBM SYSTEM 370 COMPATIBILITY IS AN IMPORTANT FACTOR
  - "3270 EMULATION" TODAY
  - SDLC COMPATIBILITY BY 1979
- RELIABILITY AND MAINTAINABILITY AT REMOTE LOCATIONS ARE AN IMPORTANT "PLUS"
- SALE OF DDP HARDWARE BECOMING INCREASINGLY COUPLED WITH SOFTWARE:
  - TOTAL SYSTEMS APPROACH TO SELLING DDP
  - NCSS AND ADP ON-SITE MINI OFFERINGS ARE THE LEADING EDGE OF THE WAVE

MARKETING AND TECHNICAL REQUIREMENTS

- BANK EXECUTIVES ARE LOOKING TO BUY TURNKEY DDP SYSTEMS RATHER THAN DEVELOP THEIR OWN MINI APPLICATIONS SOFTWARE:
  - BANKING SYSTEMS, INC.
  - SYSTEMS SOFTWARE TO PROVIDE TRANSPARENCY TO NETWORKING IS ANOTHER KEY
  - DISTRIBUTED DATA BASE SOFTWARE ALSO DESIRED

- BANKS AND SAVINGS AND LOAN ASSOCIATIONS HAVE SPECIAL DATA SECURITY REQUIREMENTS:
  - PRIVACY ACT
  - DATA TRANSMISSION ENCRYPTION OF SHARED ATM/POS DEVICES
  - DATA TRANSMISSION ENCRYPTION OF FOREIGN EXCHANGE AND FOREIGN FUNDS TRANSFER TRANSACTIONS

SYSTEMS SOFTWARE AND NETWORKING REQUIREMENTS OF

DATA PROCESSING RESPONDENTS

SYSTEMS FUNCTION	NAME	HOST		REMOTE	
		REQ	NEC	REQ	NEC
SOFTWARE					
LANGUAGES	COBOL	X			X
DATA BASE MANAGEMENT SYSTEMS	IMS, DBMS	X			
APPLICATIONS	TURNKEY		X	X	X
NETWORKING					
ARCHITECTURES	SNA		X		X
PROTOCOLS	SDLC	X		X	
	BYSYNCH (ASCII)	X		X	
	"3270 EMULATION"	X		X	
	X-25	X			X
HARDWARE/SOFTWARE INTERFACE	CICS/VTAM	X		NA	

REQ-REQUIRED
NEC-NECESSARY/DESIRED
NA -NOT APPLICABLE

RESPONDENTS' PERCEPTION OF THOSE VENDORS

INHIBITING THE USE OF DDP

VENDOR	NUMBER OF TIMES SELECTED	REASONS GIVEN
IBM	4	VERY LATE IN MARKET DRAGGING THEIR HEELS RELUCTANT TO GIVE UP LARGE HOST CONCEPT
BURROUGHS	2	NOT YET DEVELOPED PRODUCT TO SATISFY DDP NEED OF BANKING USERS
NCR	1	BEEN WAY OUT OF IT UNTIL RECENTLY

BANK RESPONDENTS' REMARKS CONCERNING IBM'S ROLE IN DDP

- "THE SNA/SDLC NETWORK ENVIRONMENT REQUIRES A LOT OF HOST OVERHEAD AND IS NOT VERY FLEXIBLE."
- "WE LOOKED AT THE IBM 3790 AND IT IS A NIGHTMARE."
- "UP TO RECENTLY, IBM HAS BEEN DRAGGING ITS FEET IN DDP."
- "WE WANTED THEM TO BID THE SERIES/1 BUT THEY RESPONDED WITH A SYSTEM 34 WHICH WOULD NOT MEET OUR REQUIREMENTS AND IS NOT COMPETITIVELY PRICED."
- "WHEN IT COMES TO DISTRIBUTED PROCESSING IBM IS LIKE SEVERAL SEPARATE COMPANIES. DIFFERENT GROUPS SEEM AT CROSS PURPOSES WITH ONE ANOTHER."
- "IN LAST 6 MONTHS IBM HAS BEEN GEARING UP. UP TO THEN THEY WERE:
  - NOT FLEXIBLE IN COST
  - NOT FLEXIBLE IN MINI ARCHITECTURE
  - PROGRAMMING LANGUAGES FOR MINIS WERE WEAK."
- "THE 3790 IS A DISMAL SYSTEM, THE 3600S ARE JUST BARELY ACCEPTABLE."

SCHOOL DISTRICTS

OVERVIEW

- CAVEATS
  - SMALL SAMPLE
  - GEOGRAPHIC CLUSTER
  - PENDING LEGISLATION
- USAGE PATTERN SIMILAR TO COLLEGES
  - INTERACTIVE STUDENT SERVICES
  - BATCH OR ON-LINE ADMINISTRATIVE SERVICES

MARKET DDP EXPERIENCE

- FAMILIAR WITH DDP FOR SEVERAL YEARS
- SOME SHARING OF SERVICES WITH LOCAL GOVERNMENT
- GEOGRAPHICALLY SMALL DISTRICTS: "DDP NOT COST EFFECTIVE"
- SAMPLE MAY NOT BE REPRESENTATIVE

MANAGEMENT AND ORGANIZATION IMPACT

- DATA PROCESSING MANAGERS - KEY ROLE IN DDP
- OUTSIDE FUNDING IMPORTANT
- DDP APPROVAL: SHORT PATH, LONG TIME

CURRENT AND ANTICIPATED APPLICATIONS

- REGISTRATION, SCHEDULING, ATTENDANCE, GRADES
- DDP FACILITATES INTER-SCHOOL PERFORMANCE COMPARISON
- FINANCIAL SYSTEMS NOT PRIMARY MOTIVATION
- APPLICATIONS NOT TIME CRITICAL

JUSTIFICATION FOR OR AGAINST DDP

- STUDENT INSTRUCTION/RECORD KEEPING CLOSER TO USERS
- INCREASED REPORTING REQUIREMENTS TO OUTSIDE (FUNDING) AGENCIES
- BUDGET AND GEOGRAPHICAL CONSTRAINTS MAKE DDP LESS ATTRACTIVE
- DDP USED AS A METHOD OF EXTENDING LIFE OF PURCHASED HOST SYSTEMS

DISTRIBUTED DATA BASES - TRADEOFFS AND TRENDS

- MAKE USERS RESPONSIBLE FOR THEIR OWN DATA
- WARY OF DBMS
- BUILT-IN COMPATIBILITY ESSENTIAL
- CONCERNED ABOUT COMMUNICATIONS COSTS

VENDOR AND PRODUCT FACTORS

- COST AND PRICE/PERFORMANCE ARE PRIMARY CONSIDERATIONS
- AVAILABILITY OF APPLICATIONS SOFTWARE VERY IMPORTANT
- COMPETITIVE BIDDING IS THE NORM
- MOST POSITIVE IMAGE IS HELD BY MINI MANUFACTURERS
- IBM: "REALLY DRAGGING ITS FEET"

REMOTE AND HOST DDP FUTURE

- LIKELY TO REMAIN A CENTRALIZED DECISION PROCESS
- MAJOR UNCERTAINTY IS THAT SCHOOL BUDGETS WILL CONTINUE TO BE APPROVED BY THE PUBLIC

COLLEGES

OVERVIEW

- MOST DDP SENSITIVE OF ALL 12 SECTORS
- DRIVEN BY ACADEMIC CURIOSITY AND FEDERAL FUNDING
- BOTH ACADEMIC AND ADMINISTRATIVE APPLICATIONS
- MOVING TO "SECOND GENERATION" OF DDP
- INTERNAL FUNDING THIS TIME AROUND
- EXPECT SATURATION IN FIVE TO EIGHT YEARS

HOW EXPERIENCED IS THE COLLEGE MARKET WITH DDP?

- FIRST IN SOPHISTICATION AND LENGTH OF EXPERIENCE
- GOAL: PUT RESOURCES AS CLOSE AS POSSIBLE TO THE USER
  - "MAKE COMPUTING A TOOL"
- INTRICATE NETWORK STRUCTURES
- BROAD MIX OF JOBS
- EDP EXPERIENCE IS LESS THAN AVERAGE, BUT MUCH OF IT IS IN DDP
  - SOME PERSONNEL HAVE NEVER KNOWN ANYTHING ELSE
- SUMMARY: A RELATIVELY MATURE DDP SECTOR

MANAGEMENT AND ORGANIZATION IMPACT

- BROAD MANAGEMENT PARTICIPATION
  - TYPICALLY STRUCTURED AS A COMMITTEE
- ADMINISTRATIVE APPLICATIONS ARE PRIMARY
- MAY BE CONSORTIUM STRUCTURE OR SERVICE BUREAU TO OTHER (GOVERNMENT, PUBLIC) AGENCIES
- DDP MOTIVATION USUALLY ARISES FROM DATA PROCESSING STAFF; NOT MANAGEMENT
- DDP USED AS A METHOD OF EXTENDING LIFE OF PURCHASED HOST SYSTEM

CURRENT AND ANTICIPATED APPLICATIONS

- ACADEMIC AND ADMINISTRATIVE

- STUDENT REGISTRATION MOST CRITICAL

- ADMINISTRATIVE APPLICATIONS FREQUENTLY ON-LINE TO HOST

- APPLICATIONS DEVELOPED IN-HOUSE

  - LITTLE INTEREST IN VENDOR SOFTWARE EXCEPT UTILITIES

- INCOMPATIBILITIES OF SOFTWARE AND HARDWARE CONSIDERED A CHALLENGE, NOT A BARRIER

CURRENT AND ANTICIPATED APPLICATIONS

- REMOTES LOOK TO DDP AS AN OPPORTUNITY TO REGAIN OR INCREASE INDEPENDENCE

- STRONG APPRECIATION FOR STANDARDS

- SECURITY AN ISSUE

  - MAINLY PASSWORDS

  - SECURITY SEPARATE FOR ADMINISTRATION AND ACADEMIC SYSTEMS

- FEW TIE-INS

JUSTIFICATION FOR AND AGAINST DDP

- PRO
  - COST SAVINGS/COST AVOIDANCE
    - COMMUNICATIONS
    - HIGHER TECHNOLOGY
    - EXTEND HOST CPU LIFETIME
    - ECONOMICS OF SPECIALIZATION
  - IMPROVED USER SERVICE
    - GRAPHICS
    - MASS STORAGE
    - SPECIALIZED APPLICATIONS
    - "FIRST-HAND CURE FOR CUSTOMER IGNORANCE" (STUDENT PROGRAMMING)
- CON
  - LACK OF FUNDS

DDP CONCERNS

- LACK OF SECURITY
- INCREASED COMPLEXITY OF BILLING
- DIFFICULTY IN ENFORCING STANDARDS
- NEED FOR STRONGER ADMINISTRATION AND/OR TEAM CONCEPT OF MANAGEMENT
- DIFFICULTY OF PIONEERING
- DDP STILL NOT TRANSPARENT TO USER

DISTRIBUTED DATA BASES - TRADEOFFS AND TRENDS

- MULTIPLE TECHNIQUES
  - DAILY DOWNLOAD
  - MULTIPLEXED/SWITCHABLE BY HOST
- CURRENTLY NO DBMS AT REMOTES
  - "MAKES NO SENSE IN DDP ENVIRONMENT, ONLY A FILE MANAGER"
  - NOT COST EFFECTIVE
  - COMPETITIVE BID REQUIREMENT PREVENTS SELECTION OF PARTICULAR DBMS

DISTRIBUTED DATA BASES - TRADEOFFS AND TRENDS

- REASONS FOR DISTRIBUTING DATA BASES
  - LOWER COST THAN COMMUNICATIONS
  - FREQUENT DATA ACCESS, SCHEDULING PROBLEMS
  - CENTRAL DATA BASE STRUCTURE TOO COMPLEX
- FEW PROBLEMS WITH COMMUNICATIONS, EXCEPT SECURITY
- INCOMPATIBLE PROTOCOLS ARE A SPECIAL PROBLEM
  - DESIRE ACCESS TO OTHER COLLEGES
  - SNA - "LIKE USING A 747 TO GO NEXT DOOR"
  - VANS "TOO EXPENSIVE"

DESIRED VENDOR CHARACTERISTICS

- RELIABILITY AND MAINTENANCE, BUT ALSO PRICE/PERFORMANCE

- COMPETITIVE BID POLICY MAY DELIVER SECOND OR THIRD CHOICE EQUIPMENT

- OUTRIGHT PURCHASE A FREQUENT OPTION

- COMPANIES REGARDED AS PROMOTING DDP:

  - DIGITAL EQUIPMENT CORPORATION

  - HEWLETT-PACKARD

  - IBM, DATA GENERAL, HONEYWELL

- REASONS

  - EFFECTIVE PRICE/PERFORMANCE

  - SUITABILITY FOR EDUCATION

  - PROCESSORS AND SOFTWARE "DESIGNED FOR LINKING"

DESIRED VENDOR CHARACTERISTICS

- COMPANIES REGARDED AS INHIBITING DDP:
  - IBM
  - CONTROL DATA CORPORATION

- REASONS
  - "INSISTENCE ON SMALL SYSTEMS TIED TO A LARGE HOST PRESENTS TOO COSTLY A SOLUTION TO DDP"
  - "SNA IS PONDEROUS - JUST OVERWHELMING"
  - "UNREALISTIC ATTITUDE THAT ALL EQUIPMENT SHOULD BE COMPATIBLE ONLY WITH THE VENDOR'S OWN PRODUCT LINE"

DDP REMOTE AND HOST FUTURE

- DDP WITHIN COLLEGES IS ILLUSTRATIVE OF A HIGHLY DECENTRALIZED SYSTEM:
  - BROAD EQUIPMENT SELECTION LATITUDE EXISTS FOR THE END USER
  - USERS ARE WILLING TO CUSTOMIZE FOR COMPATIBILITY
- COLLEGES REPRESENT ONE OF THE FEW SEGMENTS WHERE REMOTE SELLING MAKES SENSE
  - COMPETITIVE BIDDING RESTRICTS VALUE OF DIRECT SELLING
- TIGHT PUBLIC BUDGETS WILL CONSTRAIN FUTURE GROWTH

DDP REMOTE AND HOST FUTURE

- CONTINUED DEPENDENCE ON LARGE HOST

  - BUT MOVING TOWARD LARGER REMOTES AS WELL

- EXPERIMENTATION WITH MICROS LINKED TO MINIS LINKED TO MAINFRAMES

- OFFICE AUTOMATION: LARGE SCALE TEXT EDITING COMING, BUT SLOWLY

CITY AND COUNTY GOVERNMENT

OVERVIEW AND CONCLUSIONS

- UNCOMMITTED TO DDP - EXCEPT IN SPECIALIZED AREAS
- SOPHISTICATED DATA PROCESSING USERS - WELL EXPERIENCED AND EDUCATED
- CENTRALIZED PROCESSING PHILOSOPHY IS DOMINANT
- DIFFICULT TO OVERCOME ON-LINE CONCEPT
- PROCUREMENT IS VIA RFP AND BID
- HOST DIRECTS ALL DDP DECISIONS
- TURNKEY INSTALLATION IS A PRIMARY VENDOR REQUIREMENT
- GEOGRAPHICALLY RESTRICTED ENTITY

EDUCATION AND EXPERIENCE

- STRONG PROPONENT OF CENTRAL EDP
- EXCELLENT DDP DEFINITIONS AT HOST
- 63 PERCENT OF RESPONDENTS HAVE MORE THAN 15 YEARS EXPERIENCE
- NO DDP KNOWLEDGE AT "REMOTES"
- ONLY ONE CITY WITH LESS THAN 250,000 POPULATION HAD DDP
- FEW PLANNING ON INSTALLING DDP
  - "NO JUSTIFICATION"
  - "ON-LINE MEETS REQUIREMENTS"
  - "CENTRAL SYSTEM HAS ENOUGH POWER"
- INSTALLED DDP FUNCTIONS
  - COMPUTER ASSISTED DISPATCH
  - SOLID WASTE LANDFILL CONTROL
  - HOSPITAL PROCESSING

IMPACT ON MANAGEMENT STYLE

- STRONG DATA PROCESSING EXECUTIVE AND DEPARTMENT REPORTING TO:
  - FINANCIAL EXECUTIVE
  - ADMINISTRATOR
- DATA PROCESSING CHARTER COVERS ALL USERS
- A MAINFRAME SOLUTION IS FIRST
  - DDP GOOD IN NON-HOST AREAS
- CENTRAL CONTROL
  - SYSTEMS DEVELOPMENT
  - PROCUREMENT
  - EXPENSES

APPLICATION STRUCTURES

- GOVERNMENT ORIENTED FUNCTIONS
  - REVENUE ACCOUNTING
  - TAXING
  - LICENSING
  - TRAFFIC CITATION PROCESSING
  - APPROPRIATION ACCOUNTING
- MANY NON-CLASSIFIED APPLICATIONS

APPLICATION STRUCTURES

- FUNCTIONS FOR DDP CONSIDERATION
  - POLICE/FIRE DISPATCH
  - LANDFILL MONITORING
  - LIBRARY BOOK CIRCULATION
  - COURT REPORTING
  - LICENSING
  - TRAFFIC CITATION PROCESSING
- OPPORTUNITY AREA FOR WORD PROCESSING AND OFFICE AUTOMATION – "PAPER MILL"
- TIE-INS PRIMARILY WITH LAW ENFORCEMENT SYSTEMS
- 75 PERCENT WANT PACKAGES OR <u>TURNKEY</u> INSTALLATIONS

JUSTIFICATION FOR ADOPTION OR NON-ADOPTION OF DDP

- PROCEDURE COMMON ACROSS MOST RESPONDENTS
  - USER NEED
  - TECHNICAL ANALYSIS
  - HOST OR OTHER SOLUTION
  - COST JUSTIFIED
- FORMAL PROCUREMENT
  - RFP
  - BIDS
  - "LOWEST PRICED QUALIFIED VENDOR"
  - PERFORMANCE CONTRACT - 6 MONTHS

JUSTIFICATION FOR ADOPTION OR NON-ADOPTION OF DDP

- LONG "SELL" CYCLE PLUS NEGOTIATIONS
- LOCAL GOVERNMENT DATA PROCESSING EXECUTIVES DO NOT WANT DDP RESPONSIBILITY
- REQUIREMENT FOR DDP TURNKEY INSTALLATION IS FAST DEVELOPING

DATA BASE AND COMMUNICATIONS TRENDS

- COMMUNICATION ENHANCEMENTS UNIMPORTANT - LIMITED DISTANCES

- KEY APPLICATION IS LAW ENFORCEMENT

- 50 PERCENT CAN UNCOUPLE 16 PLUS HOURS

- NO DATA BASES DISTRIBUTED YET

  - 37 PERCENT WILL

  - MOSTLY VAGUE PLANS

- REMOTE FILE REQUIREMENTS 5 MILLION TO 300 MILLION BYTES

- NO BACKUP OR SYNCHRONIZING METHODOLOGY

GETTING AND KEEPING THE DDP BUSINESS

- VENDOR SELECTION - DRIVING FACTORS
  - PRODUCT PRICE PERFORMANCE
  - PRODUCT RELIABILITY
- IMPORTANT TO IMPROVE HARDWARE/SOFTWARE COMPATIBILITY - 75 PERCENT
- DDP MOTIVATING FACTORS
  - REDUCTION IN MAINFRAME USAGE
  - COST AND PRICE PERFORMANCE
  - INCREASED END USER INVOLVEMENT

GETTING AND KEEPING THE DDP BUSINESS

- PERCEIVED NEGATIVE DDP FACTORS
  - ADMINISTRATIVE COMPLEXITIES
  - LOSS OF CONTROL
  - LACK OF MULTIPRODUCT COMPATIBILITY
  - HIGH START-UP COSTS
- ABILITY TO TURNKEY IS CRITICAL
- DDP APPLICATION AREAS ARE NON-HOST ORIENTED

THE FUTURE FOR HOST AND REMOTE

- REMOTE IS SIGNIFICANTLY INFLUENCED BY HOST DATA PROCESSING STAFF
- HOST'S CHARTER COVERS ALL USERS
- CENTRAL CPU FIRST - DDP SECOND
- RFP FORCES HOST'S INVOLVEMENT - TECHNICALLY
- WORD PROCESSING MAY BE THE WEDGE
- ON-LINE PHILOSOPHY SUCCESSFUL - LITTLE INCLINATION TO CHANGE

MOTOR FREIGHT

OVERVIEW AND CONCLUSIONS

- UNCOMMITTED TO DDP - PREFER CENTRALIZED PROCESSING
- SOPHISTICATED DATA PROCESSING USERS - WELL EDUCATED
- DIFFICULT TO OVERCOME ON-LINE PHILOSOPHY
- MAJOR DDP CONCERNS ARE COST AND CONTROL
- SELL TO HOST ONLY
- STILL HOPE - "I WOULD LIKE A MICROPROCESSOR IN EVERY TRUCK"

EDUCATION AND EXPERIENCE

- STRONG PROPONENTS OF CENTRAL EDP
- EXCELLENT DDP DEFINITIONS AT HOST
- 75 PERCENT HAVE MORE THAN 9 - 10 YEARS EXPERIENCE
- NO DDP KNOWLEDGE AT REMOTES
- VERY FEW DDP INSTALLATIONS IN PLACE
  - MANUFACTURING DDP
- WHY NOT DDP?
  - NO MANAGEMENT COMMITTMENT
  - "TOO COSTLY"
  - COMMITTED TO ON-LINE

IMPACT OF MANAGEMENT STYLE

- STRONG DATA PROCESSING MANAGEMENT - CORPORATE FUNCTION

- CENTRALIZED CONTROL

  - PROCUREMENT

  - SOFTWARE

  - APPLICATION SOFTWARE

- CENTRAL PROCESSING OF ACCOUNTING AND INDUSTRY SPECIFIC APPLICATIONS

APPLICATION STRUCTURE

- MOTOR FREIGHT FUNCTIONS
  - FREIGHT BILL ENTRY
  - INTERLINE PAYABLES
  - SHIPMENT ANALYSIS
  - RATE ANALYSIS
  - EQUIPMENT INVENTORY
- FUNCTIONS FOR DDP CONSIDERATION:
  - FREIGHT BILL ENTRY
  - SHIPPING ANALYSIS
  - SALES ANALYSIS
  - PAYROLL
  - INVENTORY
  - ACCOUNTS PAYABLE

APPLICATION STRUCTURE

- NO WORD PROCESSING OR OFFICE AUTOMATION FUNCTIONS

- NO TIE-INS

- 75 PERCENT WILL DEVELOP APPLICATIONS IN-HOUSE

JUSTIFICATION FOR ADOPTION OR NON-ADOPTION OF DDP

- MANAGEMENT LOOKING TO IMPROVE TIMELINESS OF INFORMATION FLOWS

- GOOD USE OF ROI AND COST BENEFIT ANALYSIS

- WHY NOT DDP?

  - "A SIGNIFICANT CHANGE IN ATTITUDE OF MANAGEMENT MUST HAPPEN" ($97 MILLION)

  - "SIGNIFICANTLY REDUCE PERSONNEL COSTS" ($120 MILLION)

  - "BE CONVINCED IT IS THE BEST WAY TO RUN MY BUSINESS!" ($120 MILLION)

  - "THEY WOULD HAVE TO FIRE ME FIRST! ...." ($200 MILLION)

DATA BASE AND COMMUNICATIONS TRENDS

- KEY COMMUNICATION APPLICATION IS FREIGHT BILL ENTRY

- COMMUNICATION CONCERNS

  - RELIABILITY

  - MAINTENANCE

  - ERROR FREE TRANSMISSION

- LITTLE KNOWLEDGE OF DBMS

- NO PLANS TO DISTRIBUTE DATA BASES

- NO BACK-UP AND SYNCHRONIZING METHODOLOGY

GETTING AND KEEPING THE DDP BUSINESS

- KEY VENDOR SELECTION CRITERIA
  - PRODUCT RELIABILITY
  - MAINTENANCE
  - COMPATIBILITY
- VENDOR SELECTION - UNIMPORTANT FACTORS
  - VOLUME DISCOUNTS
  - SPECIAL TERMS AND CONDITIONS
  - ONE STOP HARDWARE SHOPPING
  - LANGUAGE AVAILABILITY
  - APPLICATION SOFTWARE

GETTING AND KEEPING THE DDP BUSINESS

- DDP CONCERNS:
  - COMPATIBILITY WITH HOST
  - LOSS OF CONTROL
  - TOO EXPENSIVE
  - COMMUNICATIONS PROBLEMS
  - SUPPORT REQUIREMENTS

THE FUTURE FOR HOST AND REMOTE

- CENTRALIZED PROCESSING PHILOSOPHY TO CONTINUE
- ALL DATA PROCESSING DECISIONS AT HOST
- LITTLE DDP EXPERIENCE - NO SIGNIFICANT CHANGE ANTICIPATED

HOSPITALS

OVERVIEW AND CONCLUSIONS

- UNCOMMITTED TO DDP WITH THE EXCEPTION OF SPECIALIZED AREAS
- CENTRALIZED PROCESSING PHILOSOPHY IS DOMINANT
  - UNDER ONE ROOF
  - ON-LINE EVOLUTION
- DDP OPPORTUNITIES IN NON-HOST DEPENDENT APPLICATIONS
  - LABORATORY
  - PHARMACY
- COMMUNICATIONS ARE ONLY IMPORTANT TO CHAINS
- RCS "HOST" BECOMING A POPULAR ALTERNATIVE
- APPLICATION SOFTWARE AND TURNKEY INSTALLATIONS ARE DESIRED
- BIG UNKNOWN IS FUTURE GOVERNMENTAL REGULATIONS

EDUCATION AND EXPERIENCE

- STRONG PROPONENT OF CENTRAL EDP
  - USING IN-HOUSE SYSTEMS OR RCS
- DDP DEFINITIONS RUN THE GAMUT
- 50 PERCENT OF HOSPITAL RESPONDENTS HAVE 15 PLUS YEARS OF EXPERIENCE
- SMALL HOSPITALS (LESS THAN 300 BEDS) ARE COMMITTED TO CENTRAL PROCESSING
- FEW PLANNING ON INSTALLING DDP:
  - "DON'T NEED"
  - "GOING ON-LINE"
  - "CURRENT SYSTEM HANDLES REQUIREMENTS"

IMPACT OF MANAGEMENT STYLE

- TYPICALLY DATA PROCESSING REPORTS TO FINANCIAL DEPARTMENT

  - 82 PERCENT OF NON-DDP RESPONDENTS

  - 33 PERCENT INSTALLED OR PLANNING DDP

- ANCILLARY DEPARTMENTS HAVE SOME AUTHORITY TO MOVE TO DDP

- CHAINS USE CENTRAL CONTROL AT HOST FOR ALL DECISIONS

- BASICALLY CENTRALIZED CONTROL FOR PROCUREMENT AND DEVELOPMENT

APPLICATION STRUCTURES

- HOSPITAL ORIENTED FUNCTIONS
  - ADMISSIONS AND DISCHARGE
  - LABORATORY REPORTING
  - AUTOMATED PATIENT RECORDS
  - CENSUS
  - PATIENT IDENTIFICATION
  - PHARMACY

- APPLICATIONS UNDER CONSIDERATION USING DDP:
  - LABORATORY TESTING AND REPORTING
  - PHARMACY
  - ADMISSIONS AND DISCHARGES
  - BILLING
  - MEDICAL RECORDS AND STATISTICS
  - BED AVAILABILITY AND CENSUS

APPLICATION STRUCTURES

- KEY DDP AREAS ARE PATIENT ORIENTED

- OPPORTUNITIES FOR WORD PROCESSING AND OFFICE AUTOMATION

- TURNKEYS ARE IMPORTANT

JUSTIFICATION FOR ADOPTION OR NON-ADOPTION

- JUSTIFICATION TECHNIQUES ARE VARIED
  - NO DETAILED COST/BENEFIT ANALYSES PERFORMED
- FINAL AUTHORITY IS FINANCIAL EXECUTIVE/ HOSPITAL ADMINISTRATOR
- REASONS FOR NON-ADOPTION INCLUDE:
  - "TOO SMALL"
  - "CAN'T COST JUSTIFY"
  - "LOOKING AT ON-LINE"
  - "NO NEED FOR INTELLIGENCE AT STATIONS"

<u>DATA BASE AND COMMUNICATION TRENDS</u>

- COMMUNICATION ENHANCEMENTS UNIMPORTANT
  - CHAIN HOSPITALS ARE THE EXCEPTION
- 75 PERCENT CAN UNCOUPLE 16 TO 24 HOURS
- NO DATA BASES DISTRIBUTED NOW
  - 66 PERCENT WILL DISTRIBUTE DATA IN THE FUTURE
  - PLANS ARE VERY VAGUE
- REMOTE FILE REQUIREMENTS: 1.2 MILLION BYTES TO 400 MILLION BYTES

GETTING AND KEEPING THE DDP BUSINESS

- VENDOR SELECTION - DRIVING FACTORS
  - EQUIPMENT RELIABILITY
  - MAINTENANCE
  - TURNKEY INSTALLATION (REMOTE ONLY)
- VENDOR SELECTION - RELATIVELY UNIMPORTANT FACTORS
  - VENDOR IMAGE
  - EASE OF TRAINING
  - VOLUME DISCOUNTS
  - ONE-STOP HARDWARE SHOPPING
- PERCEIVED NEGATIVE DDP FACTORS
  - LACK OF HARDWARE INTERFACE
  - LOSS OF CONTROL
  - ADMINISTRATIVE COMPLEXITIES
  - MORE TECHNICAL SUPPORT
- ABILITY TO TURNKEY IS VERY IMPORTANT

THE FUTURE FOR HOST AND REMOTE

- THREE TYPES OF REMOTE INSTALLATIONS ARE POSSIBLE

  - ANCILLARY DEPARTMENT OR STAND ALONE

  - RCS HOST

  - CHAIN

- DDP OPPORTUNITIES IN AREAS THAT ARE NOT HOST-ORIENTED

- CONTINUED CONFRONTATION OF ON-LINE VERSUS DDP

- WORD PROCESSING AND REPORTING SYSTEMS COULD BE A WEDGE

- GOVERNMENT LEGISLATION COULD SPEED DDP

- RCS COMING ON STRONG